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UNDERSTANDING INFORMAL LEARNING IN VIRTUAL PROFESSIONAL COMMUNITIES OF TEACHERS IN KAZAKHSTAN

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PREFACE

This thesis is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text. It is not substantially the same as any that I have submitted, or, is being concurrently submitted for a degree or diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. I further state that no substantial part of my thesis has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. It does not exceed the prescribed word limit for the Faculty of Education Degree Committee.

ABSTRACT

ASSEL SHARIMOVA

UNDERSTANDING INFORMAL LEARNING IN VIRTUAL PROFESSIONAL COMMUNITIES OF TEACHERS IN KAZAKHSTAN

Reinforced internationally in the context of educational improvement, teachers' professional networks, as a source of social capital, have been conceptualised as an integral part of teacher professionalism, as well as an essential element of successful educational change, and in the context of what Van Dijck, Poell and De Waal (2018) call "the platform society", the use of social media platforms within professional networks of teachers has become an agenda for both research and practice. Therefore, with the overarching aim of understanding how to promote informal learning of teachers in virtual professional communities in Kazakhstan, this study explored this phenomenon within the conceptual framework identified by a review of related concepts, in particular a triangle of learning factors, namely, the need for professional connectedness, knowledge sharing self-efficacy, and knowledge sharing and receiving. This parallel mixed-method study was carried out in 29 schools of Kazakhstan by collecting teachers' self-reported practice with the help of a paper-based questionnaires (n=440) and face-to-face interviews (n=41).

An emergent trend within the identified findings is that teachers in Kazakhstan use social media within professional communities in order to obtain knowledge, which is manifested in an overlapping mixture of news, information, opinion, experience and resources, suggesting that virtual professional communities are one of the spaces for informal learning since they provide the opportunity to gain public and/or personal knowledge related to the teaching profession. In line with the identified conceptual framework, the results of the study provide a partial explanation for teachers' engagement in virtual professional communities in the context of informal learning.

The study suggests that both the need for professional connectedness, as part of professional identity and commitment for learning, and knowledge sharing self-efficacy are positively associated with knowledge sharing and receiving. As well as identifying contextual types of virtual professional communities, the study identifies some of the contextual factors associated with the need for professional connectedness in the research

context, such as professional isolation of teachers in rural schools, the need for mentoring support, and the context of educational change, and contextual sources of knowledge sharing self-efficacy, such as professional comparison and sense of professional connectedness. Finally, in contribution to the growing body of research, the present study also argues for the importance of face-to-to face collaboration within and beyond schools in order to promote professional knowledge exchange within virtual professional communities. The research has clear implications for research and practice in the fields of teacher professional learning, particularly in Kazakhstan, hence it is believed that present study can help future efforts to support informal learning in virtual professional communities.

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CONTENTS

LIST OF ABBREVIATIONS

ADB	Asian Development bank
AMOS	Analysis of Moment Structure
AVE	Average values extracted
BERA	British Educational Research Association
BS	Basic (lower) secondary education
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Confidence Interval
CoE	Center of Excellence under the auspices of NIS
CR	Composite reliability
GFI	Goodness-of-fit index
GUS	General upper secondary education
IAC	Information Analytical Centre
IFI	Incremental Index of Fit
KSH	Knowledge sharing
KSHE	Knowledge sharing self-efficacy
KR	Knowledge receiving
LEA	Local Executive Authorities
MESRK	Ministry of Education and Science of the Republic of Kazakhstan
ML	Maximum likelihood
MNERKSC	Ministry of National Economy of the Republic of Kazakhstan Statistics committee
NAE	National Academy of Education
NCPD Orleu	National Centre for Professional Development «Orleu»
NFI	Normed Fit Index
NIS	Autonomous Educational Organization «Nazarbayev Intellectual schools»
NPC	Need for professional connectedness
NVivo	NVivo qualitative data analysis software

OECD	Organization for Economic Cooperation and Development
RMSEA	Root Means Square Error of Approximation
SCES	State Compulsory Education Standards
SDT	Self-determination theory
SEM	Structural equation modelling
SMU	Subject Methodological Units
SNA	Social Network Analysis
SPSS	Statistical Package for the Social Sciences
SRMR	Standardized Root Mean Residual
TALIS	Teaching and Learning International Survey
TLI	Tucker-Lewis Index
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UNICEF	The United Nations International Children's Emergency Fund

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CHAPTER 1. INTRODUCTION

This chapter explains the origin and rationale for the study. To do so, the first part of the introduction presents the area of education, which informed the origin of the present study as well as presenting the research context. The second part discusses the rationale for this study and outlines the structure of the thesis. Therefore, the chapter is divided into the following two main sections:

1.1 The origin of the study

1.2 The rationale and structure of the thesis

1.1The origin of the study

This section of the introductory chapter will outline the origin of this study. The first part briefly discusses the role of teachers' professional networks in the education system; the second part provides brief background information about the country with the aim of building an understanding of the context of this research; and the final part considers professional networks alongside contemporary changes in the education system of Kazakhstan.

1.1.1 Professional networks of teachers

In setting ambitious goals for student achievement, many societies are engaging in serious reforms in which teachers play a crucial role, as being both subject and object of change (Borko, 2004; Garet, Porter, Desimone, Birman, & Yoon, 2001; Villegas-Reimers, 2003). Therefore, one of the five career-long challenges for teachers, listed by Day (2017, p.166), is that

> Changes in government policies, with their increasing emphasis on promoting particular values, self-sufficiency and human capital (in terms of employment and qualifications) are likely to affect the curriculum and how it is taught as the use of technology increases and its influence continues to grow.

In order for teachers to be able to address this challenge, there is a need to build and sustain career long high levels of professionalism. Reinforced internationally in the context of educational improvement, the idea of professional networks has become an integral part of the current understanding of teacher professionalism (Hargreaves & Fullan, 2012; Shirley, 2017; Spillane, Hopkins, Sweet, & Shirrell, 2017; TALIS, 2016, 2018). In particular, Hargreaves and Fullan (2012) identify social capital as one of the integral parts of professional capital along with human capital and decisional capital. The need for the consideration of teacher professionalism in this way has been reinforced by Shirley (2017), who suggests that educators need to be proactive in developing their social capital in the contest of peer-learning networks. Equally, the conceptual framework for teacher professionalism within the Teaching and Learning International Survey (TALIS)

of Organization for Economic Cooperation and Development (OECD) in 2016 describes teacher professionalism through peer networks along with teachers' knowledge base and autonomy. Equally, collaborative culture among teachers is suggested to be one of the five pillars of teacher professionalism in TALIS 2018.

At the same time, teachers' professional networks are also on research agendas within the field of educational change and have been widely conceptualised as an essential element within the process of educational improvement (Brown & Poortman, 2018; Daly, 2010; Daly, Liou, Tran, Cornelissen, & Park, 2014; Little & Veugelers, 2005; Quintero, 2017a). To this end, Daly and Stoll (2018, p. 207) argue, that regardless of haw strategies have been elaborated and adopted, what has been omitted or disregarded, particularly within "policy thinking", are "relational linkages between individuals through which change moves".

Considering educational change from the social network perspective and summarising the related research, Daly (2010b, p.2) argues that not only should formal structures be taken into consideration for the desired change to take effect, but also "informal networks of social relations that create webs of understanding, influence, and knowledge prior to, during and after implementation of a change strategy". The argument is that it is not enough to consider knowledge transfer only within a formal professional learning framework, but it is also important "to access and coordinate knowledge" within a complex and constantly changing educational systems (Daly, 2010c, p.265).

The success of educational reform is hugely dependent on the capacity of stakeholders within the education system. Therefore, in order to plan, engage and sustain educational change, various resources are necessary. Daly suggests that these are: appropriate knowledge, necessary skills, relevant expertise and a positive attitude towards change (Daly, 2010c, p.264). Therefore, the capacity of the system to engage in reform efforts requires access to relevant expertise and appropriate information in particular as these are reported to be the critical elements in facilitating systematic reform (Coburn, Choi & Mata, 2010; Fullan, 2016). Along this avenue, Fullan (2016, p. 61) points to possible selectivity as the result of difference in access to information, which is not usually in focus, and "depends on an infrastructure of communication – ease of transportation,

resources, and density of population and ideas in the geographical area". Therefore, demonstrating the significance of "external (outside a system) expertise" in the process of building, necessary for educational change, "explicit capacity", usual models of change involve formal opportunities for professional learning and access to resource materials (Daly, 2010c, p.264). Simultaneously, a consideration of existing research provides a reasonable argument for the importance of teachers' professional network within the diffusion of innovation.

Professional networks with strong relationships promote diffusion of innovation and communicate complex information (Coburn, Choi & Mata, 2010; Fullan, 2016). Indeed, Hargreaves and Shirley (2009, p.99), suggest that in making change, it is vital to building new relationships between teachers in order to "spread new knowledge" because teachers learn better from each other rather than "by reading research reports, listening to speeches, or attending workshops". In the same way, research outside the field of educational change suggests that, regardless of the usefulness of the proposed change, there is a higher probability that changes will be adopted when they are communicated by a trusted colleague rather than an unknown expert (Kilduff & Tsai, 2003). What is more, along with knowledge transmission, networks can also influence teachers' attitude towards educational change (Cole & Weinbaum, 2010), and this research evidence signifies the urgent requirement to give attention to professional networks of teachers along with formal access to external knowledge.

Equally, along with the necessity to provide teachers with better and more access to external knowledge, including attending professional networks, Daly (2010c, p. 264) argues that there is a need to attend to "the expertise within a system or the co-constructed knowledge of educators". Considering educational change from a network perspective, he suggests that a key aspect of the change endeavour is to identify and access existing expertise. In this way, he urges for "a systematic effort to transform existing tacit knowledge and practices into explicit expertise" and concludes that "successful change efforts are a combination of exploring and exploiting existing resources. Providing opportunities to connect, leverage, and make explicit existing expertise is an important activity in support of change efforts" (Daly, 2010c, p.265). Therefore, considering access to external and internal knowledge, which is required for a capacity to engage in

educational change, professional networks of teachers have been promoted as a crucial role in educational improvement, and, moreover are considered as an instrument for innovation as when people combine outside explicit knowledge with tacit knowledge in order to solve their burning issues, innovative solutions are more likely to arise (Nonaka & Takeuchi, 1995).

Therefore teachers become an integral part of the educational community (Harris & Muijs, 2004; Little & Veugelers, 2005; Stoll, Bolam, McMahon, Wallace, & Thomas, 2006), and not only because of their voice, but also because professional networks of teachers promote shared leadership, collaboration and collective responsibility (Veugelers & O'Hair, 2005). Equally, while reiterating that the failure of change with a solely top-down approach is likely to be due to the lack of ownership, commitment and clarity of the educational change, Fullan (2016) argues that neither will bottom-up change be successful on its own as well. He advocates for coordination and combination of 'top-down and bottom-up' change forces. In this regard, it could be stated that knowledge, available within the professional relations of educators could be considered as a key driver of the dialogue between all stakeholders of educational change, which has become more accessible nowadays with social media technologies. In this respect, Castells (2013, p. xx) states that:

> Even if the Internet universe is also constructed around the power of major business conglomerates and is somewhat regulated by governments, it remains in fact a very different mode of communication, characterised by considerable autonomy of the communicating subject vis-à-vis the owners and regulators of the communication infrastructure. This is because digital networking technologies allow individuals and organisations to generate their own messages and content and distribute it in cyberspace, largely bypassing the control of corporations and bureaucracies.

Therefore, education systems, aimed at system-wide improvements, are recommended to consider putting necessary systems in place that promote, understand and support professional networks of educators. In this regard, Daly (2010b, p. 2) argues that

relationships within educators' social networks are often crucial factors when it comes to "how well and quickly change efforts take hold, defuse, and sustain" as "the value of ties between educators at different levels of a system as a rich source of social capital".

Overall, it could be argued that professional networks of teachers play a substantial role within both teacher professionalism and educational improvement, which in turn could be considered as the main challenges facing educational systems in the constantly changing world, including Kazakhstan, which is the context of the present study. The following section will provide a brief country background and consider professional networks within the current nationwide educational reform movement.

1.1.2 The context of research: school network and teachers

Located in central Asia, Kazakhstan has borders with Russia in the north, China in the east, Kyrgyzstan and Uzbekistan in the south-east and Turkmenistan in the south-west. Although, the Kazakhstan has a land area of 2.7 million square kilometres, equivalent to that of Western Europe it has a lower-density population (World Bank, 2018), 18,489,704 people as at the 1 June 2019, with 10,767,602 people in urban area (58%) and 7,722,102 in rural area (42 %). It is administratively divided into 14 regions (*Kazakh: aimak*) which are further divided into districts (*Kazakh: audan*) and three cities which do not belong to any of the regions, namely, the capital – Nur-Sultan and two cities: Almaty and Shymkent (Ministry of National Economy of the Republic of Kazakhstan Statistics committee (MNERKSC), 2019).

Kazakhstan was part of the Soviet Union and became independent in 1991. The consequence was a transition from a highly centralised economy to a market-oriented economy. In the immediate aftermath there were changes in all spheres of society, including education, the first ten years since independence there were times of economic hardship with a reduction in public expenditure on education (Ruby & Sarinzhipov, 2014, p.325). Radical adjustment involved cuts in public education budgets between 1995 and 2000, and as a result of rationalization, the closure of 590 out of 8,694 secondary schools and a reduction in teacher salaries (Asian Development bank (ADB), 2004). From the early 2000s the speed of development of Kazakhstan's economy slowed down with the

global financial crisis of 2008 but recovered by the end of 2009 and now is considered as an upper-middle-income economy (OECD, 2015).

Although with overall growth in the economy in recent years public expenditure in education has gradually increased to 3.5 per cent of GDP in 2017, it is still insufficient investment to enable the ambitious strategic plans to be realised (OECD, 2018). Since independence, along with overall changes in Kazakhstan society, the secondary school system has experienced and continues to undergo constant change within the context of the transition to a market economy, building national education, internationalisation and globalization. To this end reforms of the education system initiated at independence and has been or is currently being implemented in Kazakhstan has been extensively written in ADB (2004), Bridges (2014), Information Analytic Center (IAC), (2018), OECD (2014, 2015, 2018), Silova (2011).

School network and teachers

Primary, lower secondary and upper secondary education in Kazakhstan is secular, compulsory and provided free of charge in accordance with the Constitution and the Law on Education (2007). Kazakhstan ensures universal access to primary (99,18%) and secondary (99,8%) education (IAC, 2018). The school system is a complex network of different types of school which reflects the legacy of the Soviet Union, building national educational system since independence, market economy and strive for internationalization. According to the latest available report, the number of public day schools in 2017 was 7,047 along with '125 private schools, 75 evening schools, 100 special education establishments, 7 schools for children with deviant behaviour, 1 special treatment school, 8 international schools, 4 republican schools, 34 schools subordinated to other state authorities, 20 Nazarbayev Intellectual Schools (NIS), and 1 international branch school of NIS' (IAC, 2018, p.32-33). The network of different types of schools reflects the diversity of ethnicity and language. In 2017, 3,746 schools employed the Kazakh language as the medium of instruction for 1,323,300 pupils, 1,237 schools used the Russian language for the instruction of 378,614 pupils, and 2,037 schools employed both Kazakh and Russian languages (mixed) with 1,253,900 students. In addition, 13 schools used Uzbek, 12 schools used Uighur, and two schools employed the Tajik language as a means of instruction (IAC, 2018).

The spread of the school network reflects the large geographical area of the country and the policy of universal and compulsory access to school. Therefore, while some urban schools are suffering from a deficit of places for pupils, and others are operating a system of daily in multiple shifts. In rural areas, schools tend to be comparatively small (*in Kazakh – Shagyn zhinakty mektep*; *in Russian – Malokomplektnaya shkola*) due to low population density and policy regarding universal access. Small schools are identified as schools with particular issues to be dealt with, such as extremely low numbers of pupils per school and classes, combined classes, teachers teaching multiple subjects, insufficient infrastructure and facilities (National Academy of Education (NAE), 2015). In 2017 the number of small schools comprised 42 per cent of the total number of public schools with 8 per cent of the total number of students (IAC, 2018). Longstanding underinvestment in school maintenance and modernisation has left many schools in need of upgrading, thus, 11.7 per cent of schools are in need of complete renovation in 2017, particularly in rural areas. Of the 0.6 per cent of schools in 2017 that required emergency repair 84 per cent of them were in rural areas (OECD, 2018), and improvement in the level and quality of education in rural schools is still acknowledged to be an issue requiring attention for the education system due to a gap between urban and rural schools in terms of school resources as well as national and international assessment systems (OECD, 2015; IAC, 2018).

According to the latest national report (IAC, 2018), the number of teachers working in state comprehensive schools under the jurisdiction of the Local Executive Authorities (LEA) in 2017 was 285,996 and 58.7 per cent worked in rural schools. Of the total number of teachers 90.5 per cent have a higher pedagogical education. The difference in the percentage ratio of urban and rural teachers with higher education is gradually decreasing: in 2016 it was 3.5 per cent (91.9% and 88.4%), in 2017 it was 3.2 per cent (92.5 % and 89.3%) (IAC, 2018, p.88). The majority of teachers, namely 80.3 per cent are women and more than half of all teachers (55.6%) in Kazakhstan are 30 to 49 years old, with those up to 29 years old comprising 19.9 per cent and teachers aged 50 to 59, 21.6 per cent, and those over 59, 2.9 per cent (IAC, 2018, p.89).

1.1.3 Current educational change and professional networks

At present, the education system in Kazakhstan is going through a period of change. Part of the educational change was the establishment of Nazarbayev Intellectual Schools (NIS), aiming to be one of the "key projects facilitating modernization of the secondary education system", by fulfilling two tasks, with the first being "to develop in these schools themselves best practice informed both by international experience and what was valuable in Kazakhstan's own educational tradition. The second task was to transfer the lessons of its own experience to other schools in the system" and "one of the measurable part of the roll-out of NIS involves the introduction to mainstream schools of a new curriculum and assessment adapted from the NIS model" (Shamshidinova, Ayubayeva & Bridges, 2014, p. 79-80).

This section will consider the structures created as well as the instruments provided to promote educators' networks through which change-related resources could be exchanged. In other words, what are the research-informed arguments for the creation of professional networks involved in the educational changes (Coburn, Choi & Mata; 2010, Daly, 2010; Fullan, 2016). Educational school improvement in Kazakhstan is promoting professional networks as a means of developing and scaling up innovations as well creating opportunities for educators to extend their professional learning. To this end, Ruby and McLaughlin (2014, p.298) argue that "the collegial approach to transfer of innovation, reform and practical knowledge is appropriate for NIS and Kazakhstan" not only because of world wide experience, but also being cognisant of the realities in the country, where "the challenges of distance and a relatively weak infrastructure are balanced by the presence of a well-educated, highly motivated teaching force".

Networks and partnerships within and beyond the country

It could be argued that one part of the structure for professional networking was established in 2011 when the Centre of Excellence (CoE) under the auspices of NIS was founded with its network of branches in all regions of the country. The main aim of building capacity within the in-service teacher training system in the country. The CoE was commissioned to develop a multi-level in-service teacher training programme based on the latest research and best international practice (multi-level programme), that has been fulfilled in partnership with The University of Cambridge's Faculty of Education

and Cambridge International (Bridges, 2014; Wilson et. al., 2013). Considering the social side of education reform, Quintero (2017b) points out that "research practice partnerships" are useful because of their collaborative and context-specific nature which allows for "blending the expertise of researchers and practitioners, and to use the resulting knowledge in a manner that makes sense to those who are both responsible for implementation and have a stake in the outcomes" (p.212). To this end, it should be noted that NIS won the 2019 Wenhui Award Promoting University and School Partnerships in Advancing the Education 2030 Agenda (The United Nations Educational, Scientific and Cultural Organization (UNESCO), 2019).

At the same time, with the aim of supporting the professionalism of many teachers, CoE started working in close partnership with the already existing National Centre for Professional Development «Orleu» (NCPD Orleu), which already had branches in all the regions of Kazakhstan. Employing a cascade model of teacher professional development trainers, both the above-mentioned organizations received training and were assessed in order to be able to work with teachers according to the multi-level programme (Turner et al. 2014, Turner, Brownhill & Wilson, 2017). Therefore, the newly established CoE can be identified as a country-level network through which change-related resources (starting with multi-level and leadership programmes) are shared with mainstream schools by means of training and providing post-course support for teachers, school principals, and, by extension, officers at district and regional levels (Shamshidinova, Ayubayeva & Bridges, 2014).

The content of multi-level and leadership programmes is described extensively in the impact study of the Centre of Excellence Programmes (Wilson et al, 2016). In short, it focuses on teaching and learning approaches in order to increase professional capital teachers; it aims at extending teachers' pedagogical knowledge and skills and providing new ways of working to improve teaching and learning within schools in line with '21st century skills' as well as new ways of thinking about school leadership.

Therefore, building capacity within the country-wide network of in-service teacher training centres, which started with the multi-level programme, could be considered one of the first steps for transferring NIS experience to mainstream schools. Within the

framework of Multi-level programme both CoE and NCPD Orleu trained the trainers and from 2012-2015 trained 52,885 teachers (Wilson et al., 2016). Overall, it could be suggested that the partnership of the two networks of professional development centres (CoE and NCPD Orleu) promoted professional networking as a promising way to harness human capital and scale up innovations, and it facilitated the exchange of change-related resources across the whole country and, as a result, increased opportunities for teacher learning.

Networks within and beyond the schools

Along with setting up country-wide networks for scaling up innovations, in line with current understandings of teacher professionalism (Hargreaves & Fullan, 2012; Shirley, 2017; TALIS, 2016, 2018), the multi-level and leadership programmes strongly promote collaborative ways of working and leading learning among educators. To this end, first of all, professional dialogue and collaboration was ingrained in the process of teacher training in order to engage teachers in the learning rather than considering teachers as passive recipients. In particular, while collaborative group work was part of the first face-to-face period of training, the final face-to-face period involved "peer evaluation of the evidence gathered to measure the effects of the changes on children's learning and teachers' development" (Wilson et al., 2016, p. 59).

Moreover, as well as fostering teacher collaboration, along with face-to-face professional discussions during the courses, the CoE programmes promoted online and/or asynchronous professional exchange of knowledge during school-based practice and during the post-course period. In this way, overcoming the barrier regarding geographical spread of the school network, in-service teacher training programmes aimed to create opportunities for cost-effective, timely, professional, course-related exchange of knowledge as well as opportunities to continue, professional relationships of teachers coming from different schools which had been established during the courses.

At the same time, professional dialogue and collaboration were also promoted within the content of the multi-level and leadership programmes (Wilson et al., 2016, Wilson & Sharimova, 2019). Advocating change in the classrooms, the above-mentioned programmes promoted teacher learning and reflection by increasing collaboration within

and beyond the schools "through working in collaborative coaching and mentoring teams to support the development of pedagogical practice and leading teacher Action Research and Lesson Study enquiry" (Wilson et al., 2016, p. 51). The promotion of collaborative learning within the school is in line with the understanding that "the key variable that determines success at any innovation, in other words, is the degree of social capital in the culture of your own school. Learning is the work, and social capital is the fuel" (Hargreaves & Fullan, 2012, p. 92). By promoting peer learning, reflection and networking within and beyond the schools, the programmes aimed not only to scale up and deeply embed the innovations (the content of the programmes), but also to promote the development of collaborative culture within and beyond the schools. "Every time you increase the purposeful learning of teachers working together, you get both short-term results and longer-term benefits as teachers learn the value of their peers and come to appreciate the worth of constructive agreement" (Hargreaves & Fullan, 2012, p. 91).

Such a push for school-based learning is reflected in the report of TALIS 2018, that states that 94 per cent of teachers in Kazakhstan reported participation in peer learning and coaching, and at the same time states that "teachers, across the OECD, report that professional development based on collaboration and collaborative approaches to teaching is among the most impactful for them" (OECD, 2019b, p.4). Simultaneously, on average, within the results of TALIS 2018 principals reported lower participation in "peer/self-observation and coaching", but Kazakhstan is among the countries where more than 80 per cent of principals have participated in coaching (OECD, 2019a).

Facilitation of professional networks of teachers and school principals within the contemporary educational change agenda is also reflected in the report of TALIS 2018, which found that Kazakhstan is among the countries where at least 65 per cent of teachers participate in networks, "formed specifically for the professional development of teachers", and at least 80 per cent of principals have participated in professional networks, which is higher than average across the OECD, where it is 40 per cent and 61 per cent respectively. Simultaneously, a recent education policy review (OECD, 2018, p.13) has identified the following existing strength within the school improvement process of Kazakhstan: "School-based professional development opportunities for teachers appear

frequent and internal discussions to improve practices take place in schools and involve teaching community".

On the one hand, existing collegiality could be explained by the legacy of Soviet education system (Ayubayeva, 2018) and strong subject specific identity of teachers associated with initial teacher education system (Ruby & McLaughlin, 2018). On the other hand, it could be partially explained by the current education reform movement. A recent action-based study in four schools of Kazakhstan has reported on the potential of the multi-level programme for promoting professional networks of teachers, stating that "senior leaders who attended the Centre of Excellence in-service training programmes, had the skills to facilitate group discussions during the school network events that opened up a space for horizontal communication outside the schools" (Kanayeva, 2019, p. 208). Equally, a recent mixed-method study, that collected data in 20 schools and 11 other educational organizations in six geographical locations in Kazakhstan (Yakavets, Frost & Khoroshash, 2017), reported that coaching by teachers who participated in the multi-level programme was mentioned by most of the research participants and was considered to be an opportunity for building capacity within the schools and improving teaching and learning in classrooms. At the same time, the major finding of the study was that along with a positive reaction within the schools to the multi-level programme, some principals "use professional development programmes to address capacity in their schools more comprehensively and successfully than others" (Yakavets et al., 2017, p. 362). Similarly, recent studies (Khokhotva, 2018; Khokhotva & Albizuri, 2019) reported on the growing phenomenon of Lesson Study in Kazakhstan, where Khokhotva (2018, p.260) argues that under conditions of systematic support it "has a great potential to make a positive impact on teachers' learning, knowledge sharing and collegiality as well as to become a powerful tool to help teachers overcome collaboratively the pressure of the nationwide reforms".

To this end, recent studies suggest that promoted collaboration for learning could be a challenging endeavour due to the social and cultural context. Drawing upon case study data collected in three Kazakhstani schools, Ayubayeva (2018, p.2) argue for "the dependence of teachers' personal beliefs and values about teacher collaboration on micropolitical, school organisational culture, and socio-political factors, mainly inherited as a legacy of the Soviet education system, as well as ambiguities in the understanding

and implementation of reform initiatives dictated from the top". She argues for "the importance of building on the momentum of the recent reform initiatives" (p.295) and suggests that teacher collaboration for professional learning should be part of a 'a job responsibility' in order to avoid teacher collaboration as 'a survival strategy' or 'a compliance strategy' as well as clearly communicated by engaging teachers in "the decision and policy making process (p.297). Moreover, McLaughlin et al. (2014, p. 250) argue that amalgam of the cultural context with pressure to perform facilitated "competition between teachers to be seen as the best performers, with a notable lack of sharing of their best practice". To this end, Chankselliani and Silova (2018) observe that, connected with the marketisation, individualisation and competition have become prominent in the post-socialist transformations. Equally, identifying competition as an obstacle for collaboration, Kanayeva (2019, p. 210) adds that "professional learning or experimentation within schools" is not prioritised by school inspection system.

Overall, it could be summarised that in aiming to scale up and deeply embed the changes in the secondary education system, the current educational reform movement is promoting teacher's professional networks within and beyond the schools. Owing to the fact that I was personally involved in the above-mentioned educational change movement, particularly in the process of CoE development, I have a professional interest in exploring the ways to support teachers' professional networking for learning within and beyond the schools. Although, there are various avenues for research within the research context related to teachers' professional networking, this study explored teachers' use of social media platforms for professional networking, as I believe that in the context of what Van Dijck et al. (2018) call "the rise of the platform society", the use of social media platforms for informal learning within professional networks of teachers is an agenda for both research and practice, particularly in the context of Kazakhstan, the rationale for which will be discussed in the next section of the present chapter.

1.2 The rationale and structure of the thesis

While deliberating on the future for networks of learning, Daly and Stoll (2018, p. 211) argue that within this "growing social media space it will become increasingly important for educators, parents and communities to need to know how to identify, discern and

harness quality opportunities and learning that technology has the potential to unleash". Considering the potential of social media space, connectedness available within online social networks (Van Dijck et al., 2018) provides one of the opportunities to harness the potential of teachers' professional networks.

Taking into account the spread of the school network in Kazakhstan, with 58.7 per cent of teachers working in isolated rural areas (IAC, 2018), professional connectivity needs to step into the spotlight, and the use of social media platforms in this regard is one of the promising ways to overcome the issue of isolation, and in this way increase and leverage the social capital of teachers. To lend support for my argument, I would like to cite Hargreaves and O'Connor (2018, p.54), who also argue that regardless of the debates in relation to the usefulness and disadvantages of digital technology in the context of professional learning "in rural communities (assuming there is a broadband connectivity), digital technology makes shared professional learning available in ways that could not be offered in any other form". In this way, as reiterated by OECD (2019c, p.34), "technology offers new ways to connect schools and staff for learning and to codify knowledge via digital platforms". To this end, Robson (2016, p.121) stresses the need for research in regards with "online social spaces to warrant the hype, and as is so often the case in educational IT initiatives, the political discourses did not correspond with the messy realities of our education system on the ground".

Therefore, along with above-mentioned and in accordance with the origin of this study, which is related to the social side of educational improvement and teacher professionalism (section 1.1.1), and the contextual peculiarities related to the spread of the school network within the large geographical area of the country (section 1.1.2) as well as the context of educational changes in Kazakhstan (section 1.1.3), my overarching research aim is to explore the use of social media within professional networks of teachers in the context of informal learning.

The recent systematic literature review on online teacher communities (Lantz-Andersson, Lundin & Selwyn, 2018, p.312) concludes that "as teachers participation in online professional learning communities increase in significance over the next decade, there is clearly a need to continue to develop our understandings of how these forms of

professional learning "work" in practice"; and the literature review conducted by Macià and García (2016, p.305) called for research "to identify the factors that encourage online participation in informal networks and communities", stressing that the research contexts of the existing studies are limited in terms of country variety and the lack of data from of post-Soviet countries. It follows from that, that with the aim of understanding the nature of informal learning within virtual professional networks of teachers, the present study explored the nature of virtual professional communities and teachers' participation within them. To do so, the study commenced with a review of the related concepts in order to develop a conceptual framework and research questions for the identified overarching research aim.

Therefore, the next chapter (**Chapter 2**) provides a review of related literature in the field of informal professional learning that embraces connectivity through social media, and hence helped me to identify the framework for the study. The review of the concepts begins with that of *professional networks* and *social capital* of teachers. In particular, defining the above-mentioned concepts in this part of literature review links these concepts with the concept of *professional knowledge* as the rationale for the present study which originated in the context of the need for educational improvement and accumulation of research that connects teachers' professional networks with the diffusion of innovation and co-construction of knowledge (Daly, 2010a, Fullan, 2016; Hargreaves & Shirley, 2009; Quintero, 2017a). The second part of this chapter considers the concept of *social media* and the concept of *the need for professional connectedness* since professional connectivity, with the help of social media platforms, has been identified as the rationale for the present study due to the contextual background and current global trends. The third part explores the concepts of *virtual professional networks and communities; in* particular, this section aims to define these concepts along with other related terms, such as *knowledge sharing* and *receiving* within virtual professional communities of teachers and considers the role of *self-efficacy*. Finally, the last part of this chapter provides an overview of the conceptual framework, developed as a result of a review of the related concepts, and it presents the research questions of the present study.

In accordance with the research questions, **Chapter 3** presents and justifies the methodology of the present study. To do so, the chapter discusses underpinning philosophical assumptions and the research design is linked to the identified research questions. This is followed by a description of data collection methods. Each data collection method (questionnaire and face-to-face interview) is separately justified as a result of ethical and practical consideration. The chapter also presents the data collection process, including that of sampling and obtaining access to research participants, as well as my positionality, and a description of the participants. The final section of the chapter presents the process of analysis and concludes with the description of the measures. While qualitative data were analysed through a thematic analysis process, quantitative data were analysed by means of descriptive and inferential statistics, including binary logistic regression and structural equation modelling (SEM). It should be noted that although ethical considerations and limitations are not discussed in separate sections within the present chapter, these considerations are addressed throughout the chapter as they informed all stages of the present study.

Chapter 4 presents the findings of the present research. The findings are introduced in accordance with the three research questions that were addressed. Therefore, the first section presents the findings related to the nature of virtual professional networks and communities of teachers in the research context of Kazakhstan. In particular, the section addresses the findings related to *teachers' participation in virtual professional communities as well as their membership*. The second section discusses the findings related to knowledge sharing within virtual professional communities. In doing so, the section presents the *knowledge* identified within *virtual professional communities and the way teachers share it*. Finally, building on the findings of the first two research questions, the third section considers the findings regarding *associations* identified between *the need for professional connectedness, knowledge sharing self-efficacy and knowledge sharing and receiving* in *virtual professional communities*.

Chapter 5 starts with a discussion of the findings situated in accordance within the existing literature and, secondly, presents reflections on my contributions and implications of this study. The discussions of the findings in this chapter draw on conceptual framework identified during the research process and are structured around

the five areas, namely *virtual professional communities, the need for professional connectedness, knowledge sharing and receiving, knowledge sharing self-efficacy*, and *the role of moderators.*

Finally, **Chapter 6** concludes the thesis by providing the overall summary of the thesis as well as recommendations and areas for future research in the related fields, particularly in Kazakhstan.

CHAPTER 2. LITERATURE REVIEW: KEY CONCEPTS

Aiming to set the scene of this study, this chapter presents a review of related concepts within the framework of the overarching aim of the study. This chapter illustrates the development of the conceptual framework for the study and concludes with an overview of the conceptual framework. Therefore, the chapter is divided into the following four main sections:

2.1 Professional networks and social capital of teachers

2.2 Professional networks of teachers and social media

2.3 Virtual professional networks and communities of teachers

2.4 Overview of the conceptual framework and research questions

2.1 Professional networks and social capital of teachers

This section will present the concepts of networks and social capital not only to provide an overall context of the present study, but also to define these concepts to allow for a further operationalization within the present research. To this end, the section starts by defining general concepts of networks and social capital and is followed by their use within the field of education, particularly the informal professional learning of teachers.

2.1.1 Defining networks and social capital

Deliberating on the confusion associated with network research Borgatti and Lopez-Kidwell (2014) specify the lack of clarity in relation to understanding the nature of networks. According to their point of view, networks are defined in terms of two basic conceptualizations, namely, as nominalist and realist. The nominalist conceptualization considers networks predominantly "as models rather than things 'out there' and therefore a network is framed "by choosing a tie, such as friendship, to examine among a set of nodes", and according to the nominalist conceptualization "networks can be disconnected". Conversely, according to realist perspectives, networks are defined as "a set of interconnected nodes, which by definition cannot be disconnected" (Borgatti & Lopez-Kidwell, 2014, p.18).

To set the scene of this research, I am using Borgatti and Lopez-Kidwell's (2014) idea of the realist conceptualization of the networks. In accordance with this conceptualization, when defining networks within the first volume of the trilogy *'The information age: economy, society and culture'* which is entitled *'The rise of the network society'* Manual Castells (2000, p. 501) considers networks as

> open structures, able to expand without limits, integrating new nodes as long as they are able to communicate within the network, namely as long as they share the same communication codes (for example, values or performance goals). A network-based social structure is highly dynamic, open system, susceptible to innovating without threatening its balance.

Networks generate various theories, according to Borgatti and Lopez-Kidwell (2014), a network construct can be a dependent or independent variable. Therefore, in pointing to the existence of various research traditions and theories within both directions, they identify social capital as a network theory that "considers the consequences of network phenomena" (p.2) where a network construct is an independent variable. By examining well-known network theories, they identify key principles, classifying them into two models, namely, network flow and network architecture. In the first model networks are considered as a "system of pieces through information flows" and the second one considers networks as a "system of girders that create structures of dependencies" (p.2). When explaining these models, Borgatti and Lopez-Kidwell (2014) presente key concepts of the social capital research tradition with respect to both network flow and architecture models.

Therefore, being considered as a consequence of networks, social capital research perspectives use networks to understand the success within two main concepts that is

> capitalization, meaning that nodes acquire ideas, resources, and opportunities through their ties, and this process either directly increases their human capital or increases their ability to exploit their human capital, which in turn contributes to their success in terms of performance and rewards (Borgatti & Lopez-Kidwell, 2014, p.16).

and coordination where "networks provide benefits because they can coordinate or 'virtually agglomerate' multiple nodes in order to bring, all the resources to bear in a coordinated fashion (and avoid being divided and conquered)" (p.16). In order to set the scene of the present research, it should be stated that the social capital research perspectives within the present study consider networks to understand the success within the concept of "capitalization".

From the advent of this concept to the current use, social capital has become on object for reconsideration and redefinition within different research fields. Considering this phenomenon within the field of sociology, Bourdieu, Coleman and Putnam are referenced as founders of the notion of social capital as a field of research (Ostrom &Ahn, 2003;

Schuller, Baron, & Field, 2000). Bourdieu (1986) considers capital in "three fundamental guises", namely economic capital, cultural capital and social capital. Demonstrating how these three manifestations of capital are interrelated, he defines social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (1986, p. 248). For Bourdieu, social capital is contingent on the size and quality of one's networks, hence he is explaining the ways in which upper-class people used their connections to obtain benefits.

Coleman (1988), in his turn, has developed this concept by suggesting the influence of social relationships of non-elite groups, in particular, he is considered to be the first to introduce social capital into educational research by signifying the influence of social capital within the family and social milieu on the process of child development. Coleman (1988) argues that as physical and human capitals promote 'productive activity', social capital also has a profound effect, although it is less tangible in comparison with other forms of capital as it is situated in relationships. He states (1988, p.98) that "social capital is defined by its function" and consists of "a variety of different entities, with two elements in common: they all consist of some aspects of social structure, and they facilitate certain actions of actors – whether person or corporate actors – within the structure". Therefore, he concludes that, like other forms of capital, social capital influences the likelihood of certain achievements without which they would not be possible.

While Coleman was the first one to systematize the concept of social capital within the education domain, Putnam (1996) could be considered to be the one who has increased the importance of research related to social capital, which has consequently promoted its development (Ostrom and Ahn, 2003). Due to the fact that Putnam (1996) introduced the idea of social capital at the national level, underlining the importance of civic commitment in the promotion of social unity and democracy, thus he "can claim responsibility for its entry into mainstream political discourse" (Schuller et al., 2000, p.8). In his paper "Who killed Civic America", Putnam used the term social capital Putnam (1996, p.56) understands it to mean "features of social life – networks, norms, and trust – that enable participants to act together more effectively to pursue shared objectives".

Previously, Fukuyama (1995, p.26) has defined social capital as “a capability that arises from the prevalence of trust in a society or in certain parts of it”.

Overall, it could be stated that the significance of social capital has been located so far within a wide range of phenomena, particularly human capital (Coleman, 1988), country (Putnam, 1996) or nations (Fukuyama, 1995). So, it seems to be the case that there are various definitions to describe social capital from different angles. In synthesizing existing definitions, Lin (2001, p. 25) defines social capital as “resources embedded in social networks accessed and used by actors for actions”. In this study I will adopt a relational perspective on social capital, in which social relations generate added social value and therefore could be both a ‘product and generator of relational goods, depending on temporal phase’ (Donati, 2014, p.296).

Therefore, following Borgatti and Lopez-Kidwell’s (2014) classification of social capital research traditions, and considering the consequence of networks, this research views social capital as existing within the concept of “capitalisation”, which links the process of “nodes” obtaining “ideas, resources, and opportunities through their ties” (p. 16). In this regard, Lin (2001) also argues that human actions are rational and motivated to preserve or obtain valuable resources in order to persist. He reasons that maintaining valued resources promotes expressive action, whereas looking for and obtaining additional valued resources primarily results in instrumental action.

Lin (2008) suggests that there are two types of interaction embedded in the networks. Homophilous relations take place when actors have similar resources to share and heterophilous relations characterized by dissimilar resources. The homophily principle suggests an interrelationship between “intensity of interactions, shared sentiment, and shared resources” (p. 60). However, when there is a need for additional resources, the relationships extend to having ties with different characteristics and resources – the heterophily principle (Granovetter, 1977; Burt, 1992), which is one of the significant arguments in the “bridging theories of networks” (Lin, 2008, p. 61). In this type of interactions, the density of the network and the intensity of relationships decreases, while resources embedded within the networks become more diverse (Lin, 2008).

In addition, the theory of social capital acknowledges significant patterns of social relations, which are differentiated in terms of intensity and reciprocity of relations among the ties (Lin, 2008). Citing his earlier work, Lin (2008) presents three layers of social relationship that distinguish such intensity and reciprocity. The innermost layer is characterized by binding relations, in which ties share sentiment and provide mutual support, engaging in reciprocal and intense interactions. In other words, strong ties in a dense network. The interim layer is characterized by a mixture of stronger and weaker ties or direct and indirect ties: such relations are referred to as bonding and are typical of most social networks. Sharing particular features and interests "keeps the ties in a 'social circle'" (p.60). The final layer is related to shared identity regardless of members' interaction, as mediating through the "collectivity", these relations provide members with a sense of belongingness, for example "clan or club" (Lin, 2008, p.60).

Therefore, the positive result of such relationships is what they are striving to achieve. Lin (2008, p. 62) maintains that such differentiation helps "to clarify some confusion in the general literature on the so-called 'bonding' or 'bridging' of social capital […] Social capital does not bind or bridge. It is the nature of the social networks that bind, bond or bridge". Overall, Lin (2008, p.62) asserts that the network-based theory of social capital has a conceptual transportability from the micro to the macro perspective, taking into consideration "the investment, formation, and returns to social capital for the collectives - be they associations, organizations, communities, regions, or nation-states". Therefore, if we accept that homophilous and heterophilous types of interactions happen within the networks), we could assume that at a collective level there are two types of social capital, internal and external social capital.

Social capital theory has been used extensively in theorising different phenomena within the social sciences, including education. The next section will reflect on existing literature where social capital is identified within teachers' professional learning.

2.1.2 Social capital of teachers and professional knowledge

In the context of constant reforms, the notion of teacher professionalism has become an important object for consideration and redefinition. Reconceptualizing teacher professionalism, Hargreaves and Fullan (2012) identify social capital as an integral part

of professional capital along with human capital and decisional capital. They argue that social capital creates opportunities for knowledge increase as it suggests an access to the human capital of other people and also "develops resilience" due to the opportunity to contact people for advice. In this way, advocating a combination of high human capital and high social capital, Hargreaves and Fullan (2012) argue that high social capital gives rise to human capital and that "social capital strategies are one of the cornerstones for transforming the profession" (p.91). In line with this understanding, Spillane et al. (2017) suggest that "social capital can help expand our understanding of human capital, in particular the development of human capital in organizations and systems" (p. 96) and that building social capital requires structural and systemic strategies in order to create conditions for effective professional interaction.

Being reinforced internationally, the idea of professional networks has become an integral part of the current understanding of teacher professionalism, hence the conceptual framework for teacher professionalism within the OECD's Teaching and Learning International Survey (2016) describes teacher professionalism in terms of teachers' knowledge base, autonomy and peer networks. Such amplification of teacher professionalism with the aim of improving teaching and learning has been described by Shirley (2017, p. 81) as a "new professional imperative" as opposed to "the old" prescriptive imperative, like the ideological and imperial imperatives". One of the components of this new imperative is that "educators must develop their social capital through peer-learning networks that they themselves lead and control" (p.81).

Therefore, collaborative culture among teachers is one of the five pillars that support teacher professionalism, which is analysed in the OECD's Teaching and Learning International Survey (2018). Being a professional denotes a lifelong learning stance, both on an individual and a collective level, so that there is the ability to collaborate and learn together, improving not only their own professional practice but also that of colleagues and the whole profession. It centres on professional communication between colleagues, creating and sustaining networks to be able to participate in professional dialogues and knowledge sharing (Boud & Hager, 2012; Hargreaves & Fullan, 2012). In this regard, a recent OECD report (2019c) on reviewing human resource policies for schools suggests

support for continuing professional learning and collaboration as one of the six policy approaches.

To this end, by stressing the requirement for lifelong and collaborative networked learning, the literature suggests that successful networking contributes to teachers' learning, opens them to critique, and enlarges their repertoire (Lieberman & Mace, 2010; Varga-Atkins, Qualter, & O'Brien, 2009; Wilding & Blackford, 2006). Stressing the involvement of learning within networks, Veugelers and O'Hair (2005, p. 213) point to the opportunity for educators to reflect and construct new knowledge as well as suggesting networked learning as a "model for developing knowledge-rich, informed professional judgements".

Moreover, an important aspect of the benefit of teacher networking is that it promotes an exchange of teaching and learning resources, that can be reused or adapted by teachers in their own context, demonstrating the need to spend less time on "inventing the wheel", particularly, at a time when teachers are supposed to move from being disseminators of knowledge towards being facilitators of learning (Rennie & Mason, 2004). At the same time, along with the increase in knowledge, the research on teacher networking suggests an increase in social support, sense of belonging, commitment and satisfaction (Clandinin et al., 2015; Fox & Wilson, 2009; Fox & Wilson, 2015; Le Cornu, 2013, Struyve et al., 2016), teacher retention (Struyve et al., 2016) and performance (Leana & Pil, 2006, 2017; Ronfeldt, 2017).

Therefore, since this research originated in the field of educational change, particularly within a growing body of research related to the importance of teachers' professional networks in the diffusion of innovation and co-construction of knowledge (Daly, 2010a; Fullan, 2016; Hargreaves & Shirley, 2009; Quintero, 2017a), this study is interested in professional knowledge as part of resources embedded in professional networks of teachers. To this end, it could be argued that professional networks of teachers provide opportunities for mutual learning and one of the main arguments is rooted in the current understanding of professional knowledge formation. Opportunities for formal learning, which are provided by experts, resulting in the awarding of some form of accreditation (Boud & Hager, 2012; Knight, 2002), are necessary but not sufficient for teacher learning.

Existing research has identified the importance of informal learning, also referred to as non-formal learning, incidental learning, work-based learning or spontaneous learning (Day, 1999; Eraut, 2000; 2004; Knight, 2002). De Laat (2012, p. 10) goes further and suggests that 'non-formal' is often related the planned in advance activities, namely "workshops or coaching, without being certified", whereas 'informal learning' related to the unplanned learning process. "Informal learning therefore typically displays a bottom-up structure, embedded in the working culture and regulated by the professionals themselves (ibid).

2.1.3 Professional knowledge and informal learning

Eraut's work in 2000 conceptualized the exchange of knowledge within networks of social workers as being informal learning. I have drawn on his perspective of "reactive learning" as one type of informal learning. Eraut wrote about the complexity of informal learning modes, recognising that this can take the form of implicit learning, where people do not think consciously about their actions and are not aware that learning is taking place. This is in contrast to deliberative learning, where people set particular learning goals and allocate time to acquire new knowledge. Eraut suggests that engagement in deliberative activities requires critical reflection and how this fit into existing knowledge bases. A third category falls as in between these two modes of informal learning, which he termed reactive informal learning (ibid).

Reactive informal learning, Eraut (2004) occurs nearly spontaneously as a result of situations without setting aside special time for it. This might include "noting facts, ideas, opinions, impressions; asking questions; observing effects of actions [and] recognition of possible future learning opportunities" (Eraut, 2004, p.250). Although, Eraut also argues that "most learning from experience has some implicit aspects, and that awareness of explicit learning does not mean that implicit learning is not also taking place [and] outside formal education and training settings, explicit learning is often unplanned" (Eraut, 2004, p.250).

Reactive informal learning is a helpful way of conceptualizing professional learning within teacher networks because the exchange of professional knowledge does not necessarily happen in a deliberately planned way. Although an exchange of professional

knowledge within professional networks of teachers could be organized in the form of formal meetings and conferences, knowledge exchange can also happen in a spontaneous way, in the form of news, ideas, opinions, experience and teaching resources.

Therefore, in conceptualising an exchange of professional knowledge and professional networks of teachers within reactive informal professional learning, it is helpful to define what teachers' professional knowledge actually is. Eraut (1995, 2000, 2004), considers professional knowledge in terms of two parallel definitions of knowledge. On the one hand 'codified knowledge' also referred to as 'public knowledge' or 'propositional knowledge', on the other hand 'personal knowledge', which could be either 'explicit' or 'tacit'.

Codified knowledge within formal education is manifested in "texts and databases and the cultural practices of teaching, studentship, scholarship and research", whereas in workplaces it is found "in the form of textual material containing organization specific information, records, correspondence, manuals, plans, etc." (Eraut, 2004, p.263). Whereas personal knowledge is defined as "the cognitive resource which a person brings to a situation that enables them to think and perform" (Eraut, 2000), and which at the same time involves a personalised form of codified knowledge, skills and capability or expertise; hence while a codified knowledge is explicit, personal knowledge can be both explicit and implicit. In the context of teachers' professional knowledge codified version of teachers' personal knowledge could be personally developed teaching resources, while ideas and opinion based on personal teaching experience and/or acquisition of public knowledge could be considered as implicit personal knowledge. Therefore, since professional knowledge exchanged within teachers' network could vary in accordance with the teachers' learning needs, such knowledge could be defined as a combination of public and personal knowledge related to the teaching profession.

Overall, it could be argued that an exchange of professional knowledge within a teachers' network could be conceptualized as part of reactive informal learning within the framework of the present research. In examining how informal learning is happening, Eraut (2004, p.267) noticed that "getting information and asking questions were important modes of learning that stretched beyond the usual cluster of immediate

colleagues", in this way he reports that some employees in comparison with others were more proactive in establishing relationships "with a wider network of knowledge resource people". In this regard, considered from the network perspective, the position within the social structure and the quality of relationships determine the types of knowledge received (Scott, 2000). Thus permanent research findings suggest that within this light the focus of the old saying has been changed from "It's not what you know, but who you know" to "Who you know defines what you know" (Cross, Borgatti & Parker, 2002; Daly, 2010).

Simultaneously, rapid development of digital technologies, particularly the rise of social media platforms, has increased opportunities for teachers' professional networking and hence has increased opportunities for exchange of professional knowledge, therefore suggesting more space for informal learning. Taking into account the spread of the school network in Kazakhstan with 58.7 per cent of teachers working in isolated rural areas (IAC, 2018), social media platforms is one of the promising ways to overcome the issue of isolation, and in this way increase opportunities for exchange of professional knowledge. In this regard, the next section reviews the concept of social media as well as the need for professional connectedness associated with the rapid increase in such platforms.

2.2 Professional networks of teachers and social media

Conceptualizing social media as one of the opportunities to increase the exchange of professional knowledge within networks of teachers, this section will define the concept of social media and consider why it expands the space for professional knowledge exchange.

2.2.1 Defining social media

Nowadays, social media is a phenomenon, which is increasing in use exponentially, and owing to the fast development of technologies and the consequent opportunities provided within social media, bounding the term is not an easy task. 'Social media' implies the use of various types of platform, and it is difficult to make a clear division between them because there is constant change and as suggested by Van Dijck (2013, p. 8), "carving out and appropriating one or more specific niches is part of the continuous battle to dominate a segment of online sociality".

A common general explanation is the understanding that social media is "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content" (Kaplan & Haenlein, 2010, p. 61). As described by O'Reilly, (2005) the term 'Web 2.0' is associated with websites which provide various technical opportunities, with the emphasis on participatory, user-generated content rather than as a source of information. Therefore, social media applications allow the user to "create, share, and exchange information in a virtual community" (Ngai, Tao & Moon, 2015, p.33) and break down "communication barriers once caused by geographic isolation, which has helped individuals develop more 'friends' and expand their social circles; especially those who have social or physical mobility restrictions" (p. 41).

However, Van Dijck (2013, p.12-13) argues that the key terms, that are used to characterize the functions of social media, such as 'social', 'friends' and 'collaboration' are the reflections of "early utopian visions of the Web as a space that inherently enhances social activity". She suggests that instead of using the term 'social media', it would be better to use the term 'connective media' as the meaning of the words that describe these platforms informed by "automated technologies that direct human sociality"; therefore she considers that "making the Web social" denotes "making sociality technical".

In this way, Van Dijck (2013**)** is articulating one of the biggest criticisms of social media by stressing that platform particularly companies usually emphasize human connectedness and lessen automated connectivity. The major hidden aspect of using social media is related to the business model of social media (Lanier, 2018), with its fundamental principles of "datafication, manipulation, and commoditization" (Couldry & Van Dijck, 2015, p. 3). Therefore, aiming to support social connection and in this way enhances social life though the use of digital technologies but may "also 'erode' sociality or 'downgrade' it, by translating sociality into something else, such as marketability" (Marres, 2017, p. 76). To this end, while Lanier (2018) suggest the need for companies that run social media platforms to innovate their business model, Van Dijck et al. (2018, p.162) suggest that "for democracies to work in the age of platformization, they need to concerted effort of all actors – market, state, and civil society – to build a sustainable and

trustworthy global ecosystem" as "the question who governs the platform society and how it should be governed based on what values is complex and multifaceted". The key questions are, should individuals' data be freely accessible to the platform companies and secondly, ought the ownership of the platforms lie with a sovereign government.

At the time of writing these big questions of ownership and access are being debated but regardless of existing critiques and problems with social media, the potential benefits of social media have become widely accepted particularly with regard to the power to easily connect. Fuchs (2017, p.38-39) defines social media as "various forms of online sociality: collective action, communication, communities, connecting/networking, co-operation/collaboration, the creative making of user-generated content, playing, sharing", This wider definition situates understanding of sociality within the area of social theories. He argues that there are various terms linked to the word 'social', such as "information, communication, community and collaboration", so when considering social media there is a need to spell out the meaning of the term 'social' (Fuchs, 2017). At the same time, he admits that social media is "a complex term with multi-layered meanings" and provides the example of the Facebook platform which has multiple functionality and can be a source of information, as well as a tool for communication and creating and sustaining communities (Fuchs, 2017). In my study the exchange of professional knowledge takes place within the network of teachers through informal learning in what I am defining as *professional communities*. This is a form of sociality. Most users of social media want to be better informed and many sign up to sites because of the need for *connectedness* (Van Dijck, 2013, p.4). The next section will consider the need for connectedness in the context of teachers' use of social media for professional networks within a professional community.

2.2.2 The need for professional connectedness

One of the main facets of connectedness within social media platforms is the ubiquity of being able to be connected with each other, regardless of time, location or distance. Hence, social media provides teachers with opportunities to share, create and access resources, from remote locations at any time of the day enabling teachers to keep up to date with the latest teaching techniques or general changes in the field of education as well each other's work (Booth, 2012; Ciampa & Gallagher, 2015; Wideman, 2010).

Social media promote teacher cooperation, collaboration and interaction, and offer opportunities to solve problems across schools, regions and countries with no associated travel or cost (Buffington, 2008; Holmes, 2013; Lieberman & Pointer Mace, 2010; Pan & Franklin, 2011; Trust, 2012).

Another dimension of connectedness within the social media space for teachers' networking is the connection between physical and virtual worlds. Owen, Fox and Bird (2016, p. 172) argue that "social media can be seen as a tool which mediates connectivity, either allowing a community to migrate and develop online to create new discourses or innovative practices, or as an online space for new 'virtual' communities of practice to emerge". At the same time, while teachers can strengthen their offline connectivity with the help of social media, as online practice may evolve from offline context, there is a possibility for online practice to be extended offline (Fox & Bird, 2017).

In this regard, understanding the interplay between online and offline activities within five groups of Italian teachers that shared school-related resources and practices on Facebook, Ranieri, Manca and Fini (2012) also demonstrate two-way movement between online and offline practice:

> people participating in thematic groups are already involved in a project in real life, and their participation in the Facebook group has the main function of maintaining real-life relationships. On the contrary, in the case of generic groups, the online sharing of ideas seems to generate new projects in real life, with an impact on offline activities (p. 766).

Equally, considering the connectivity promoted by social media, Trust and Horrocks (2017, p. 645) observe that as more and more teachers become "Connected Educators and act as conduits between online spaces and communities in their schools, the boundaries between face-to-face and online communities of practice are blurred" and therefore they suggest that "increasingly more teachers are engaging in blended learning opportunities".

Existing literature suggests that teachers engage in social media space within their professional networks in order to avoid professional isolation. For instance, one qualitative study (Wesely, 2013), exploring world language teachers' use of Twitter, suggests that one of the reasons for their participation within this professional social media space is the feeling of professional isolation. Many teachers may be objectively isolated in their schools because they may be the only teachers of a specific language in their schools and, hence, have "a profound feeling of professional isolation in their school environment" (Wesely, 2013, p.312).

Similarly, examining reasons for teacher participation in "on-line communities", Hur and Brush (2009), as a result of 23 interviews with teachers, found that their participation is driven by the isolated school environments. At the same time, on the one hand, they argue that it is a matter of availability of people who understand teaching related issues and, on the other hand, suggest that "even teachers who could share common interests with colleagues in their local schools felt isolated because there was no time to talk" (Hur & Brush, 2009, p.295).

Another facet of professional isolation that prompts educators to use social media has been pointed out by Cho (2016) as a result of a qualitative case study based on the data collected from 17 school administrators from the USA and Canada. The study suggests that interaction with colleagues by means of Twitter increased school administrators' sense of belonging as participation reduced their sense of isolation and fostered a feeling of specialness. The participants in the study reported reduced professional isolation, which was a result of their formal position in the school that implied that there were only few people within the school sharing the same job, and that there was competition within the district. Simultaneously, the participants in this study reported a sense of being special, in particular they described the feeling of being special because they could connect with colleagues from different states, provinces and countries as well as being able to connect collegially with well-respected administrators.

Considering the need for professional connectedness in the context of teachers' use of social media for professional networks, this study conceptualises it as part of professional identity and commitment for learning, which will be discussed in the next section.

Professional identity and commitment for learning

Connectedness provided by social media platforms may have a positive influence on professional relationships. Social network sites and commonly used applications "promote interpersonal contact, whether between individuals or groups; they forge personal, professional or geographical connections and encourage weak ties" (Van Dijck, 2013, p.8). Recent research in this area links the use of social network sites directly with the process of building social capital through both bridging and bonding relationships resulting in increased opportunities for exchange of professional knowledge (Ellison, Steinfield, & Lampe 2007; Ranieri, Manca et al., 2012; Hofer & Aubert, 2013).

Furthermore, Lin's (2008) description of the three layers of social relationships involved in social capital theory (2.1.1) suggest that an important final layer is associated with shared identity which is independent of the members' interaction within a network. In mediating through the "collectivity" of networks, these relations provide members with a sense of belonging, as sharing particular features and interests through keeping the ties in 'social circle'. In this regard, Tajfel (1974, p.72) had previously identified social identity as the "knowledge that he [the individual] belongs to certain social groups together with some emotional and value significance to him of his membership" and this seems highly relevant to the interactions taking place in social media networks. In my study, the need to belong is associated with teachers' professional practice and, hence, professional identity. In this regard, drawing a parallel between practice and identity, Wenger (1998, p.149) draws parallels between practice and identity and suggests five characteristics:

- Identity as negotiated experience. We define who we are by the ways we experience ourselves through participation as well as by the ways we and others reify ourselves.
- Identity as community membership. We define who we are by the familiar and unfamiliar.
- Identity as learning trajectory. We define who we are by where we have been and where are we are going.
- Identity as nexus of multi membership. We define who we are by the ways we reconcile our various forms of membership into one identity.

- Identity as a relation between the local and the global. We define who we are by negotiating local ways of belonging to broader constellation and manifesting broader styles and discourses.

Therefore, considering professional identity as one of the layers of social relations within professional communities in a social media space helps to explain why along with personal use of social media, teachers use it for participation in professional communities. At the same time, conceptualizing an exchange of knowledge within professional communities of teachers in a social media space as part of informal learning and understanding that "learning is an issue of engaging in and contributing to the practice of their communities" (Wenger,1998, p.7), in line with the conceptual framework of informal learning, provided by Eraut (2004) the need for professional connectedness is related to the commitment for learning.

Teachers' commitment, in turn, is closely linked with teachers' identity (Day, Eliot & Kington, 2005) as "how teachers perceive and enact their professional identity is an indicator and a key variable in their sense of professionalism, levels of commitment and capacity for resilience" (Day, 2017, p.25). In particular, "teachers' perceptions of their own professional identity affect their efficacy and professional development as well as their ability and willingness to cope with educational change and to implement innovations in their own teaching practice" (Beijaard, Verloop, & Vermunt, 2000, p.750). In this regard, the formation of teachers' identity is "the result of combinations of biographical, personal, professional, policy and workplace influences, and these are subject to change" (Day, 2017, p.26). Therefore, the need for professional connectedness within the social media space has been conceptualized within the present study as the need to be less isolated from other professionals for objective and subjective reasons and part of teachers' professional identity and commitment for learning.

2.3 Virtual professional networks and communities

Considering the exchange of professional knowledge within the network of teachers as part of informal learning, *professional communities* have been conceptualized as a form of sociality within the social media space (section 2.2.1), and thus this section aims to

define the concepts of virtual professional networks and communities as well as considering participation within virtual professional communities.

2.3.1 Defining virtual professional networks and communities

The review of the literature suggests that researching the use of social media practitioners and researchers consider it from different perspectives. As a consequence, there is a range of terms within research papers, such as: online communities (Duncan-Howell, 2010; Hur & Brush, 2009; Khalid, Joyes, Ellison, & Daud, 2014; Tsai et al., 2012); online learning communities (Booth, 2012 ; Holmes, 2013); virtual communities (Chang & Chuang, 2011; Chiu, Hsu, & Wang, 2006; Hsu, Ju, Yen, & Chang, 2007); virtual learning community (Chen, Chen, & Kinshuk, 2009; Lin, Hu, Hu, & Liu, 2016); professional virtual communities (Chen & Hung, 2010; Lin, Hung, & Chen, 2009); online professional communities of practice (Tseng & Kuo, 2014); professional learning networks (Trust, 2012); online teacher networks (Schlager, Farooq, Fusco, Schank, & Dwyer, 2008); informal online communities and networks (Macià & García, 2016). Overall, it can be clearly seen that some studies use the concept of 'network' whereas others refer to 'community' or both concepts together. Simultaneously, some studies refer to 'online', whereas others to 'virtual' or 'electronic' interaction. this study I will refer to virtual professional community of teachers with the following rationale in mind.

Networks and *communities*: According to Wenger, Trayner, & De Laat (2011) "the work of a community is to develop the learning partnership that creates an identity around a common agenda or area for learning", whereas "the work of a network is to optimize the connectivity among people." (p.12). They define network as "the set of relationships, personal interactions, and connections among participants who have personal reasons to connect" (p.9). In this way, personal reasons to connect within a network can also be a shared language or a common agenda, thus a network can form one interconnected community. A network can simultaneously generate interconnected communities within its social structure and provide an opportunity for knowledge exchange between such communities. Therefore, in accordance with the rationale for the present research (informal learning), both the concept of 'networks' and the concept of 'professional communities' as a form of sociality within social media space were identified as the object of the present research.

Virtual. In describing interactions in relation to using the Internet, such terms as 'online' and 'offline' are frequently employed: we understand that being 'online' means to be connected to the Internet at a particular time (for example, online conferences suggest that participants are connected to the Internet at the same time and, thus have an opportunity for a live conversation, synchronous); whereas to be 'offline' frequently, implies that a person who is registered within a certain system in the Internet is not currently connected to the Internet and therefore will only be able to contribute to the communication once he/she is 'online' (asynchronous). Therefore, members of social networks within a web space can have both online and asynchronous communication, the latter happening when participants interreact with each other, despite being online at different times. Hence, if electronically connected networks involve asynchronous communication, then to describe them as online will be limiting, so the adjective 'virtual' better describes this kind of interaction. According to the Oxford dictionary (Stevenson & Waite, 2011), 'virtual' within computing means "not physically existing as such but made by software to appear to do so". In relation to the notion of networks it can be stated that virtual networks, by means of selected digital technology, provide an opportunity for people to interact with others, which would not be possible face to face, and to be connected with others with whom they would not be connected in real life.

Therefore, the concept of *virtual professional networks of teachers* is defined as a network of teachers virtually interconnected within a social media space and interacting on professional issues. For the first part of this explanation, it is important to exclude the type of Internet communication (such as one-to-one email correspondence) which does not provide an opportunity for instant public interconnection. Simultaneously, the significance of the second part of this explanation is that it helps to narrow the common agenda of the network, which is a teacher's professional issues and hence to exclude social networks, of which teachers may also be members. Meanwhile, the concept of *virtual professional communities* was understood as a virtually connected group of people united by a common agenda or area of learning.

The effective use of a virtual professional community is not an easy process. Simply creating an online space for teachers does not necessarily guarantee that teachers will

harness the potential of these instruments or will even participate. A virtual professional community will not flourish unless members are engaged, even if it has a user-friendly interface, tools and ethos (Bishop, 2007) as there are various barriers, which will be discussed in the next section.

2.3.2 Participation in virtual professional communities

To develop and support sharing culture within virtual communities can be regarded as the core challenge, as there is a tendency for ninety per cent of users to be observers or 'lurkers', who view others' postings without posting their own (Nonnecke & Preece, 2000). The review of existing literature including the recent systematic literature reviews on online teacher communities (Lantz-Andersson et al., 2018; Macià & García, 2016), suggests the majority of participants tend to observe without participating. For instance, Seo and Han (2013) reported that only a small number of teachers share their teaching materials, with many preferring only to use but not to contribute.

As teachers' participation in such communities is growing remarkably, we need to increase our understanding of "how these forms of professional learning "work" in practice" (Lantz-Andersson, Lundin & Selwyn (2018, p.312). At the same time, calling for research to understand the drivers for participation in online informal networks and communities, Macià and García (2016) stressed that the existing studies are limited in terms of country variety and the lack of data from post-Soviet countries. Therefore, in line with increased attention to and promotion of professional networks of teachers for learning in Kazakhstan, including by means of digital technologies (section 1.1.3) there is clearly a need for exploring teachers' engagement in such spaces. To this end, conceptualizing teachers' engagement within professional networks of teachers in social media spaces as part of an informal learning (sections 2.1.2; 2.1.3), this study aims to contribute to a better understanding of the exchange of professional knowledge within virtual professional communities, as such to understand how to promote knowledge sharing within professional networks of teachers in a social media space.

Recent cross discipline literature review on social media for knowledge-sharing (Ahmed, Ahmad, Ahmad, & Zakaria, 2019) suggests that social media use for knowledge sharing is growing area of research and social capital theory, theory of planned behaviour, the

technology acceptance model, as well as social cognitive and social exchange theories, were the most extensively adopted within the reviewed articles. Increasing number of theoretical frameworks used in researching this phenomenon highlights its complexity and the need for multiple-perspective research as "any theory of human adaptation and change in an electronic era must, therefore, consider the dynamic interplay of technological developments and a variety of psychological and structural determinants" (Bandura 2002, p.2). Since theoretical framework of this study is related to informal learning within professional networks of teachers in social media spaces, knowledge sharing conceptualised within the context of informal learning. The next section aims to present the understanding of knowledge sharing within this study.

2.3.3 Knowledge sharing in virtual professional communities

Conceptualizing knowledge sharing within virtual professional communities as opportunity for informal learning, this section will define the concept of knowledge sharing and situate this concept within the theoretical framework of informal learning.

Research on knowledge sharing within virtual reality varies in its explanation of what knowledge sharing stands for. The review of existing research shows that 'knowledge sharing' has been used interchangeably with 'knowledge exchange' (Cabrera, Collins & Salgado, 2006; Tseng & Kuo, 2014). In this regard, Wang and Noe (2010) argue that knowledge exchange includes both knowledge sharing and knowledge seeking, which is in line with the explanation of Ridings, Gefen, and Arinze (2002), who consider that getting or obtaining information are the two main ways to use virtual communities. They suggest that reading or asking for information refers to the obtaining mode, whereas creating a post in response or starting a new topic can be considered as information giving and, thus, implies "a greater measure of active participation" (p. 274).

However, John (2013) argues that in the context of Web 2.0 the concept of sharing, being a fundamental and constitutive activity, has obtained a new meaning. Therefore, describing sharing in a simple way within this context denotes participation in Web 2.0. To lend support for his argument, he provides three explanations, which could be summarised in the following way. On the one hand, the notion of sharing is closely interconnected with the development of electronic computing from "time-sharing through

to file-sharing" (p. 175). On the other hand, being built on a more traditional meaning, the multifaceted nature of sharing in the context of Web 2.0 involves both communication and distribution in comparison with traditional definitions of sharing in which these processes are separated. To this end, sharing refers to the activities in which users of social media platform "bring the page to the attention of others" (p. 167).

Therefore knowledge sharing, being the focus of the present research is understood as being in line with John's (2013) explanation of sharing and therefore refers to the activities in which teachers give or request knowledge in response or on their own initiative, implying the active use of social media within their virtual professional network. Therefore, receiving knowledge refers to observing others' activities, implying passive use of social media within their virtual professional communities.

2.3.3.1 Informal learning and knowledge sharing

Considering professional knowledge sharing within virtual professional communities of teachers as activities in which teachers give or request knowledge in response or on their own initiative suggests that knowledge sharing by teachers provides opportunities for informal learning on the part of both active and passive participants in virtual professional communities. In other words, in the context of virtual professional communities, knowledge sharing refers to what Eraut (2000, p. 116) calls the "recognition of learning opportunities" as teachers consider this place to provide one of the opportunities to find answers to their questions or learn from other people's questions and responses.

Therefore, considering professional knowledge sharing within virtual professional communities to be part of informal learning (section 2.1.3), the conceptual framework of the present research was informed by the theoretical framework of understanding learning factors within informal learning (figure 2.1) provided by Eraut in 2004 as the result of a series of large- and small-scale projects with nurses, engineers and accountants. Although, the research findings are not directly related to the teaching profession, "its findings, nevertheless resonate with much research on the conditions necessary for continuing professional development of teachers" (Day & Gu, 2010, p.29).

Figure 2.1: Part of the two-triangle model of the factors affecting learning in the workplace (Eraut, 2004, p. 269)

Figure 2.1 presents part of the two-triangle framework for understanding the main factors influencing learning in the workplace, which summarises part of the conclusion of the research study conducted by Eraut (2004). A triangular relationship between confidence, challenge and support has been explained in the following way: the first concept that has been highlighted as one of utmost importance was the term 'confidence', suggesting that a high proportion of learning at work take place "through doing things and being proactive in seeking learning opportunities, and this requires confidence" (p. 269); simultaneously, confidence arises "from successfully meeting challenges in one's work, while the confidence to take on such challenges depended on the extent to which learners felt supported in that endeavour" (p. 269). Hence, the essence is that with the absence of challenge or sufficient support to motivate people to respond to challenge or challenge themselves of their own accord, there is a decrease in confidence and consequently learning motivation (p.269).

Considering other emerging factors, this triangle (figure 2.1) was updated with additional elements, such as feedback, the value of the work and commitment (Eraut, 2004). While value of the work was added as an additional motivating factor, commitment to learning was understood as a complementary element to confidence, which is associated with the level of proactiveness in making use of "learning opportunities available to them" (Eraut, 2004, p. 270). To this end, Eraut argues that "commitment is generated through social inclusion in teams and by appreciating the value of the work" and "concerns about career progress that arise from inadequate feedback of a normative kind can weaken motivation and reduce commitment to the organization" (Eraut, 2004, p.270).

Therefore, in the context of the present research, in which professional knowledge sharing within virtual professional communities is understood as part of informal learning, the triangle of learning factors within informal learning (figure 2.1) was adapted to provide a conceptual framework for the present inquiry. In particular, the first element related to 'feedback and support' has been replaced by 'knowledge sharing and receiving' (section 2.3.3) due to the fact that active participation of the members of virtual professional communities, which refers to 'knowledge sharing' is the activity through which feedback and support is provided by and for teachers.

The second element related to 'challenge and value of the work' together with 'commitment' (part of the third element) was phrased as 'the need for professional connectedness' (section 2.2.2), based on understanding that firstly, the need for professional connectedness could be associated with various challenges that teachers face, including professional isolation, and, secondly, the need for professional connectedness within virtual professional communities could be related to the need to belong as part of a teachers' professional identity and commitment for learning.

Finally, in line with Eraut's (2004) argument that informal learning "recognizes the social significance of learning from other people, but implies greater scope for individual agency than socialization" (p.247), the third element related to the confidence was also used within the present study in order to explain informal learning within virtual professional communities. To this end, with respect to confidence, Eraut (2004) suggests that the dominant meaning is related to Bandura's concept of personal self-efficacy. To this end, recent results of research from outside the field of education (Yuan, Lin & Zhuo, 2016) reveals that "personal factors are stronger drivers of knowledge sharing than e-service factors […] and provide empirical support to the application of the theory of self-efficacy in explaining knowledge sharing" (p. 68-72). These arguments are based on social-cognitive theory, according to which behaviour of human beings, particularly their choice, motivation and self-regulation is based on belief systems, and one of the central ones is the belief concerning personal efficacy (Bandura, 1986, 1997).

Therefore, while the concepts of 'the need for professional connectedness' and 'knowledge sharing' have already been described above (sections 2.2.2 and 2.3.3), the

concept of 'self-efficacy' has not been discussed within the context of the current research. Hence, before providing an overview of the conceptual framework employed within the present study, the following section aims to consider the concept of knowledge sharing self-efficacy within virtual professional communities of teachers.

2.3.3.2 Knowledge sharing and self-efficacy

The concept of self-efficacy refers to "people's belief about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1986, p.71). It is considered an important mechanism for self-regulation by controlling people's activity by means of four main processes, namely, motivational, cognitive, affective and selective, and these "different processes usually operate in concert, rather than in isolation, in the ongoing regulation of human functioning" (Bandura, 1997, p. 116). Bandura (1997) argues that self-efficacy is not fixed but generative, with cognitive, social, emotional and behavioural processes requiring to be organised and orchestrated. Therefore, there is a difference between possessing certain skills and being able to use them in a given situation. As the result, different people with the same skills in different circumstances may perform differently due to their personal beliefs about the self-efficacy. Hence, "effective functioning requires both skills and the efficacy beliefs to use them all" (p.37). In this regard, Bandura (1997, p.79) argues that self-efficacy beliefs are built from four main sources of information:

- Enactive mastery experiences that serve as indicator of capability;
- Vicarious experiences that alter efficacy beliefs through transmission of competences and comparison with the attainments of others;
- Verbal persuasion and allied types of social influences that one possesses certain capabilities;
- Physiological and affective states from which people partly judge their capableness, strength, and vulnerability to disfunction

One of the first kinds of personal efficacy related to the context of the present research is the construct of sociability. Based on relevant research findings, Bandura (1997) argues that social support is not self-generated essence, which is looking for people to help, on the contrary, it is people who are responsible for creation and support of such

relationships, consequently, it requires a solid 'sense of social efficacy'. Therefore, despite the fact that people can know how to behave socially, due to the low level of social efficacy they can behave in unsociable way. In this case, their knowledge is dominated by their efficacy beliefs. Consequently, socially efficacious people themselves create supportive relationships, by raising efficacy in others. Examples of such support could include both the process of modelling and provision of incentives. In relation to the research phenomenon, it may be observed that the detrimental effect of the referred to social self-efficacy of the participants within virtual professional networks has been reiterated by many researchers. For instance, Nistor, Batles and Schustek (2012) argue for the necessity of virtual mentoring, provided by key participants in virtual communities, who "may be helpful initiators of knowledge-sharing" (p. 108).

Equally, Lisbôa and Coutinho (2011) identify the fact that the "E-moderator emerges as the key element in fostering virtual communities". Such moderators could be considered as facilitators of collective self-efficacy, as in accordance with Bandura (1997, p. 477), providing people with a belief of possibility to "produce valued effects" as the result of their "collective action" as well as equipping them necessary means could be considered as a vital part in the "enablement process". To this end, "perceived collective efficacy is defined as a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainment" (1997, p.477).

Another aspect of self-efficacy belief within the context of the present research is related to participants' belief in their ability to use information technology. Nistor, Baltes and Schustek (2012) argue that when the use of technology is applied to the theories of reasoned action and planned behaviour, within various theories that have emerged the most representative one is the unified theory of acceptance and use of technology. Having tested this theory empirically within an academic virtual community of practice at a German university, they conclude that participants' technology-related expertise dramatically affected participation. In this regard, Bandura (2002) argues that "efficacy beliefs to master technological developments affect well-being and productivity in the modern workplace" (p. 6) and research within a virtual learning community of college and MBA students (Chen at al., 2009) demonstrates that "web-specific self-efficacy" is associated with knowledge-sharing intention and consequently with knowledge sharing.

Finally, self-efficacy belief that has been identified as the object of the present research is related to knowledge itself. The literature suggests that the concept of self-efficacy has been utilised within knowledge-management research. To this end, reviewing existed literature, Kankanhalli, Tan and Wei (2005, p. 122) suggest that "knowledge self-efficacy is typically manifested in the form of people believing that their knowledge can help to solve job-related problems, improve work efficiency, or make difference to the organization". In the context of web-based knowledge exchange beyond organizations "the lack of knowledge self-efficacy is the mostly cited reason explaining why customers do not want to share knowledge with others" (Lee, Cheung, Lim & Ling Sia, 2006, p. 289).

Equally, when considering teachers' knowledge sharing within virtual space, it can be stated that the concept of knowledge self-efficacy is gradually receiving attention. For instance, an empirical study of a teachers' online community of practice "that provides teachers and educators with resources for professional development and updated news on education-related issues" in Hong-Kong (Cheung, Lee, & Lee, 2013, p. 1361) suggest that, in comparison with participants' satisfaction, knowledge self-efficacy has a stronger association with the decision to continue knowledge sharing practice.

In the same way, self-reported data from the largest online professional communities in Taiwan demonstrate that knowledge sharing self-efficacy has both a direct and a positive relationship with knowledge sharing practice as well as being a predictor of altruistic intention and performance expectation, the latter two factors in their turn being related to knowledge sharing (Tseng & Kuo, 2014). Teachers' knowledge sharing self-efficacy in their study is understood as "efficacious belief in sharing their teaching practices, resources, and personal experiences with other members in the online knowledge community" (p. 42).

Therefore, professional knowledge within the present study is defined as a combination of public and personal knowledge related to the teaching profession (section 2.1.3). Along with codified public knowledge, teachers' personal knowledge could be codified in the form of personally developed teaching resources, while ideas and opinions based on

personal teaching experience and/or acquisition of public knowledge could be considered as personal knowledge. Teachers' knowledge sharing self-efficacy within the present study is defined as the efficacious belief of teachers in relation to sharing their teaching resources, opinion, ideas and experiences with other members of their virtual professional communities.

The effect of knowledge sharing self-efficacy

In accordance with Bandura (1997, p. 116), a critical body of research demonstrates that efficacy beliefs control people's activity through four main processes, that is motivational, cognitive, affective and selective, and these "different processes usually operate in concert, rather than in isolation, in the ongoing regulation of human functioning" (p. 116). Since "efficacy-activated events, such as emotional states, are of interest in [their] own right (p.116) and "selection process are differentiated from cognitive, motivational and affective processes because in prompt dismissal of certain courses of action on grounds of personal inefficacy, the latter regulative processes never come into play" (Bandura, 1997, p.161), the present section aims to discuss briefly some potential cognitive and motivational processes whereby knowledge sharing self-efficacy can produce its' effect.

Cognitive processes

"Efficacy beliefs affect thought patterns that can enhance or undermine performance (Bandura, 1997, p.116). One of the thought patterns that influences self-regulatory cognitive process is the concept of ability, which is regarded by some as an acquirable skill, but by others as an inherent aptitude (Bandura, 1997; Dweck, 2006). Equally, Bandura (1997, p.120-121) suggests:

> important belief system that affect how efficacy information is cognitively processed is people's belief about the extent to which their environment is influenceable or controllable. People who are harried by self-doubts anticipate the futility of efforts to modify their life situation. They are much less likely to undertake and sustain actions designed to improve their circumstances than those who have a firm belief in their efficacy to bring about meaningful social change.

In the context of this study, particularly within virtual professional communities, initiated formally or informally, a relevant hypothesis might be that teachers' knowledge sharing self-efficacy is associated with teachers' believe that their voice is heard and/or they can influence the learning process of teachers and pupils.

Motivational processes

"Much human behaviour, being purposive, is regulated by forethought that embodies cognised goals. The stronger the perceived self-efficacy, the higher the goals people set for themselves and the firmer their commitment to them" (Bandura, 1997, p.117). "Most human motivations are cognitively generated. In cognitive motivation, people motivate themselves and guide their actions anticipatorily through the exercise of forethought" (Bandura, 1997, p.122). To this end, related research distinguishes three different forms of cognitive motivator based on attribution, expectancy value and goal theories, with outcome expectancies and goal motivators operating via the anticipation mechanism, while perceived causes of success and failures operate retrospectively (figure 2.2) (Bandura, 1997, p.122-123).

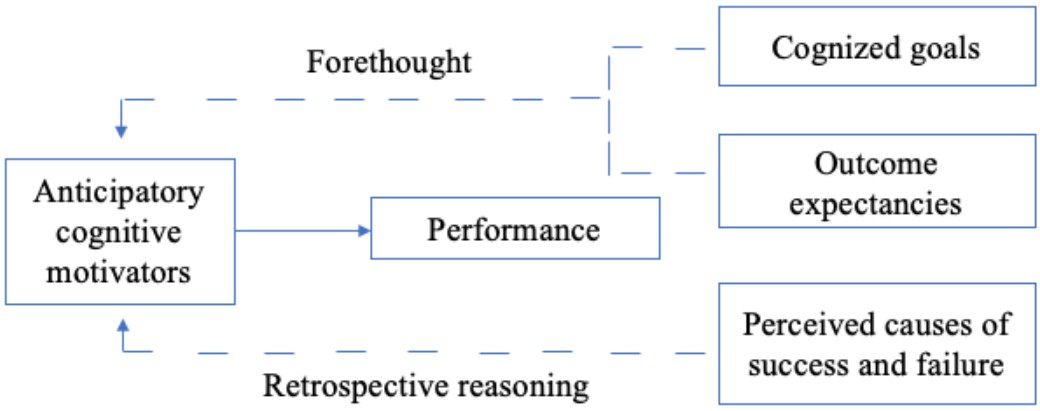


Figure 2.2: Schematic representation of cognitive motivation (Bandura, 1997, p.123)

"Personal goals and aspirations, rooted in a value system, provide further incentives and guides for action. People also regulate their life course by the outcomes they expect their efforts to produce" (Bandura, 2002, p.4). In this regard, considering teachers' outcome expectations with regard to sharing knowledge within virtual professional networks in

order to enhance their competence and work efficiency, Tseng and Kuo (2014) suggest that these personal outcome expectations influence knowledge receiving, whereas prosocial commitment (which can be distinguished as a community related outcome expectation) influence knowledge sharing.

Meanwhile, the construct of prosocial commitment (enjoyment of helping other or altruism), as one of the factors predicting knowledge sharing has been referred to in other reviewed studies as well (Chen, Fan, & Tsai, 2014; Lai & Chen, 2011). Apart from altruistic motives, prosocial commitment could be explained by egoistic motives, such as promotion of reputation or reciprocal return in the future, and the more closely members of online community of practice are connected, the greater will be recognition of, and altruism towards, others (Tseng & Kuo, 2014).

Emphasizing the post-knowledge-sharing evaluation process with the help of expectation disconfirmation theory, Cheung et al. (2013) examined such factors as reciprocity and enjoyment of helping. They demonstrated that members were satisfied when their expectations of reciprocity and capability to help others were fulfilled. Moreover, the authors observed an increase in participants' self-efficacy as a result of the successful outcomes of their contributions. Hence, they argue for the importance of satisfaction for knowledge sharing in virtual professional communities of teachers. Along with reciprocity, that has also been identified by Hew and Hara (2007), as a motivation, Young and Tseng (2008) point out that participants share their knowledge when they receive appreciation: this, in their opinion, illuminates "the fear of stepping over the professional territories of others" (p. 62).

The overarching aim of the present study is to explore the use of social media in developing the social capital of teachers in the context of informal learning. Therefore, setting the scene for the present study, the present review of related concepts has contributed to the conceptual framework of informal learning in virtual professional communities of teachers, which will be described in the next section.

2.4 Overview of conceptual framework and research questions

With the overarching research aim to explore the use of social media within professional networks of teachers in the context of informal learning, the aim of this study is to understand teachers' engagement in social media spaces within the process of informal learning in professional communities. Therefore, the study explored the nature of virtual professional communities and teachers' participation within them. To do so, the study commenced with a review of the related concepts in order to develop a conceptual framework and research questions.

Overall, the review of related concepts within this study identified the role of teachers' social capital, in particular, the exchange of professional knowledge within professional networks and communities of teachers as part of the opportunities for informal learning (sections 2.1.2). Simultaneously, acknowledging the rise of social media platforms and opportunities provided by them to increase social capital, identifying the professional community as a form of sociality within the social media space (section 2.2.1 and 2.2.2), virtual professional community of teachers was conceptualised as the space for informal professional learning (section 2.3.1).

At the same time, the review of related literature illustrated that social capital is a quite contentious and complicated term suggesting positive and negative consequences (section 2.1.1 and 2.1.2). Therefore, leveraging the potential of social capital, particularly in relation to knowledge embedded in professional networks, is not a straightforward activity due to existing downside of this phenomenon as well as contextual factors. On the one hand, considering homophilous and heterophilous nature of relations that produce similar and dissimilar resources respectively (section 2.1.1), sustaining professional relations only with like-minded and familiar individuals also suggest availability of limited knowledge. Equally, in the context where the personal attitude to work and relationships of some teachers could still be guided by the Soviet values and beliefs in relation to principles of collective, it could also suggest homophily of views and groupthink (Ayubayeva, 2018; Kutsyuruba, 2008).

On the other hand, allowing people to connect in new ways and take advantage of extended access to information, social media amplifies existing connections (Boyed, 2014). In this way, Boyed argues that social divisions we are facing in the 'offline world' have been reflected and reinforced online, and consequently reproducing information inequality. To this end, she suggests that "the transformative potential of the internet to restructure social networks in order to reduce structural inequality rests heavily on people's ability to leverage it to make new connections" (Boyed, 2014, p.173). Equally, one could argue that reduction of structural inequality, particularly in social media space, requires certain conditions on a system level.

Therefore, in order to promote informal learning in virtual professional communities there is a need for understanding contextual practice and challenges of building and leveraging social capital in a social media space. To this end, conceptualizing knowledge embedded in virtual professional networks and communities as part of teachers' social capital, informal learning within virtual professional community was identified as an object of this study, which is represented in the centre of the triangle within the visualized framework (figure 2.3).

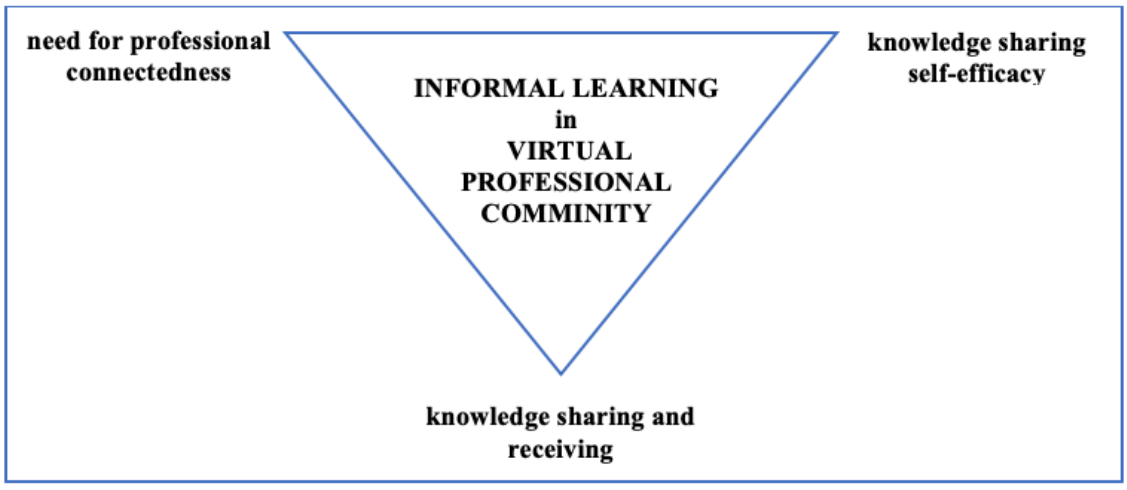


Figure 2.3: Conceptual framework of informal learning in virtual professional communities

Aiming to explore the process of informal learning in virtual professional communities of teachers in Kazakhstan, the triangle of learning factors within informal learning provided by Eraut in 2004 (section 2.3.3.1) informed the conceptual framework (figure

2.3) developed for the present inquiry. A triangular relationship between learning factors, such as the need for professional connectedness, knowledge sharing self-efficacy, and knowledge sharing and receiving, will be summarized in the following sections.

Knowledge sharing and receiving

Conceptualizing knowledge in virtual professional communities as a combination of public and personal knowledge related to the teaching profession (section 2.1.2), and knowledge sharing in virtual professional communities of teachers as activities in which teachers give or request knowledge in response or on their own initiative (section 2.3.3) suggests that knowledge sharing of teachers provides opportunities for informal learning on the part of both active and passive participants in virtual professional communities. In other words, in the context of virtual professional communities, knowledge sharing refers to what Eraut (2000, p. 116) calls the "recognition of learning opportunities" as teachers consider this place to be one that provides opportunities to find answers to their questions or learn from other people's questions and responses, which simultaneously create conditions for informal learning for passive participants. Therefore, the element of the original triangle (section 2.3.3.1), namely, 'feedback and support' has been replaced by 'knowledge sharing and receiving' due to understanding that active participation of the members of virtual professional communities, which refers to 'knowledge sharing' is the activity through which feedback and support is provided by and for teachers. In other words, it could be argued that informal learning in the context of virtual professional communities is taking place only if knowledge is shared.

The need for professional connectedness

As "originally, the need for *connectedness* is what drove many users to these sites" (Van Dijck, 2013, p.4), the need for professional connectedness has been conceptualized as the second element within a triangular relationship between factors of informal learning within virtual professional communities. The need for professional connectedness, in its turn, could be related to what Eraut (2004, p. 269) names in his theoretical framework the 'challenge and value of the work' and 'commitment'. The need for professional connectedness within virtual professional communities has been conceptualised as the need to belong as part of professional identity and commitment for learning and the need to be less isolated from other professionals for objective and subjective reasons (section

2.2.2). Therefore, understanding that teachers' identity is "the result of combinations of biographical, personal, professional, policy and workplace influences, and these are subject to change" (Day, 2017, p.26) and understanding that the need for professional connectedness within the social media space in the context of Kazakhstan as one of the instruments to reduce professional isolation, the following hypotheses are suggested as part of the triangular relationship within identified conceptual framework for understanding informal learning in virtual professional communities:

> H1: Need for professional connectedness is positively related to knowledge receiving in virtual professional community;
>
> H2: Need for professional connectedness is positively related to knowledge sharing in virtual professional community.

Knowledge sharing self-efficacy

Finally, the last element of this conceptual framework is in line with Eraut's (2004) argument that informal learning "recognizes the social significance of learning from other people, but implies greater scope for individual agency than socialization" (p.247): therefore the third element related to confidence, remained unchanged from the original triangle. With respect to confidence, Eraut (2004) suggests that the dominant meaning is related to Bandura's (1982) concept of personal self-efficacy. To this end, recent results of research from outside the education (Yuan et al., 2016) reveals that "personal factors are stronger drivers of knowledge sharing than e-service factors […] and provide empirical support to the application of the theory of self-efficacy in explaining knowledge sharing". These arguments are based on social-cognitive theory, according to which behaviour of human beings, particularly their choice, motivation and self-regulation is based on belief systems, and one of the central is the belief in personal efficacy (Bandura, 1986, 1997), which refers to "people's belief about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1986, p.71).

Professional knowledge within the present study is defined as a combination of public and personal knowledge related to the teaching profession (section 2.1.2). Therefore,

along with codified public knowledge, teachers' personal knowledge within virtual professional communities could be codified in the form of personally developed teaching resources, while ideas and opinion based on personal teaching experience and/or acquisition of public knowledge is considered as personal knowledge. In this way, teachers' knowledge sharing self-efficacy within the present conceptual framework is defined as the efficacious belief of teachers about sharing their teaching resources, opinions, ideas and experiences with other members of their virtual professional communities. The following hypothesis is suggested as part of the triangular relationship within the identified conceptual framework that supports the exploration of opportunities for informal learning in virtual professional communities:

> H3: Knowledge sharing self-efficacy is positively related to knowledge sharing in virtual professional community.

Research questions

Overall, the conceptual framework of this study is based on the assumptions that in order for informal learning to take place in virtual professional communities, there is a need for knowledge exchange to take place within such communities, for which teachers should want to connect with other and at least some of the teachers in the network have high knowledge sharing self-efficacy. My aim is to understand teachers' engagement in virtual professional communities within the process of informal learning. The research questions for this study were developed within the identified conceptual framework set out in figure 2.3. My goal will be to inform research and practice in the field of teacher professional learning in Kazakhstan and beyond. To this end my overarching research question is related to how informal learning is promoted in virtual professional communities of teachers in Kazakhstan. My final research questions are:

1. What is the nature of virtual professional communities?
2. What is the nature of knowledge sharing and receiving in virtual professional communities?
3. To what extent and in what ways is the need for professional connectedness and knowledge sharing self-efficacy associated with knowledge sharing and receiving in virtual professional communities?

CHAPTER 3. METHODOLOGY

This chapter will describe how the identified research questions were addressed within this study. To do so, by providing the methodological rationale, the chapter presents philosophical and practical aspects of the study, considered within the process of the planning and implementation stages of the study. Although ethical considerations are not discussed in a separate section within this chapter, these considerations as well as limitations are addressed throughout the chapter as they informed all stages of the study. Therefore, the chapter is divided in the following five main sections:

3.1 Philosophical assumptions

3.2 Overview of the research design

3.3 Data collection methods

3.4 Data collection processes

3.5 Data analysis

3.1 Philosophical assumptions

With the overarching aim of providing empirical insights into teachers' engagement in virtual professional communities, and in order to inform research and practice in the fields of teacher professional learning and educational improvement, pragmatism is the philosophical approach that shaped the process of the present study, as it "takes an explicitly value-oriented approach to research" (Johnson & Onwuegbuzie, 2004, p.17) and is "oriented toward 'what works'"(Creswell & Clark, 2011, p. 42). In other words, since the present study identified teacher professional learning and educational improvement as its explicit value and was oriented towards understanding of 'what works' for teachers in the process of leveraging the potential of social media, pragmatism was adopted as a philosophical approach in this research.

The study is based on pragmatism, which presents practical and applied research philosophy (Teddlie & Tashakkory, 2003, p.21). This approach is in line with my drive to find a workable solution to a very real practical problem of connectivity. Johnson & Onwuegbuzie (2004) capture this well when they say that pragmatism "offers a practical and outcome-oriented method of inquiry that is based on action and leads, interactively, to further action and the illumination of doubt as it offers a method for selecting methodological mixes that can help researchers better answer the question" (Johnson & Onwuegbuzie, 2004, p.17). The next sections will set out how I tried to achieve this in my study.

The research is guided by my conceptual framework (chapter 2, section 2.4) which has identified informal learning in virtual professional communities as a theoretical lens through which to explore teachers' use of social media for professional networking. To investigate this further I tested the hypothesised relationship within the conceptual framework, particularly between knowledge sharing and receiving, the need for professional connectedness and knowledge sharing self-efficacy. However, I was keen to go further and deeper by exploring the nature of knowledge sharing and receiving and identify the ways in which the need for professional connectedness and knowledge sharing self-efficacy are associated with knowledge sharing and receiving.

I have made some ontological assumptions in that my study investigates both 'singular and multiple realities' (Creswell & Clark, 2011) as the research questions imply. Consequently, I have tested out my hypotheses identified within the conceptual framework and also delved into the understanding of multiple perspectives that help to explain these hypotheses feel secure that ontological assumptions of the study are in line with the understanding that "pragmatism not only replaces arguments about the nature of reality as the essential criterion for differentiating approaches to research, it also recognizes the value of those different approaches as research communities that guide choices about how to conduct inquiry" (Morgan, 2014b, p. 1049). Indeed, Morgan (2014a) stresses that questions related to the truth or the nature of reality within pragmatism are less dominant as they are more related to the question of the usefulness of the knowledge within the process of producing projected outcomes.

Consequently, epistemological assumptions informing the research were based on "both objective and subjective points of view", depending on the part of the research process, as the research phenomenon is considered to exist "on a continuum, rather than on two opposing poles"; therefore, the logic of the research process is both "inductive and hypothetico-deductive" (Teddlie & Tashakkory, 2009, p.19-37). This duality and the useful points of connecting qualitative and quantitative data within a pragmatic approach were also explained as "abductive reasoning that moves back and forth between induction and deduction" and "intersubjective approach [that] captures this duality" (Morgan, 2007, p. 71-72). The exploration of teachers' engagement in virtual professional communities and the nature of knowledge sharing and receiving within, as well as to what extent and in what ways the need for professional connectedness and knowledge sharing self-efficacy are associated with knowledge sharing and receiving were informed by both inductive and deductive reasoning.

At the same time, along with the practical aspects of pragmatism, the broader philosophical basis of the research is in line with widely shared elements of pragmatism. Therefore, with a distinctly 'value-oriented approach' to the study (Johnson & Onwuegbuzie, 2004), which was identified and influenced by my professional positionality (chapter 1), the present study developed a research design in accordance with the identified research questions (chapter 2) and the context of the research, aiming

to provide evidence in the way that Dewey called 'warranted assert ability' (Johnson & Onwuegbuzie, 2004). "Instead of knowledge, he [Dewey] spoke as 'warranted assertions', where warrants come from the outcome of inquiry – that is, the outcomes of using a belief in practice, in which knowing cannot be separated from doing" (Morgan, 2014, p. 1049).

Finally, one of the implications of considering pragmatism as a paradigm is to break the dependence on "a metaphysical version of the philosophy of knowledge as a lens for examining social research" (Morgan, 2014, p. 1051). In this way, Morgan argues that despite the fact that this change did not have the original aim of connecting pragmatism with mixed-method research, pragmatism suggests that research may be considered an experience that results from the beliefs and actions of researchers. This warrants consideration of methodology as the study of the methods therefore changes examination of social research to questions related to researchers' choices and the impact of these choices (Morgan, 2014). In continuation of this argument, considering the path of pragmatism, Morgan (2014) points that research always influenced by cultural, historical and political contexts, and therefore, suggest that attention should be paid on how above-mentioned factors associated with the methodological choices and the ways of interpreting the results of these choices. The next section will set out how I developed my methodology in line with a pragmatic philosophical approach to this research study and will discuss why certain methods were chosen, and certain decisions were taken, following the 'pragmatic method' for the choice of the research methods (Johnson & Onwuegbuzie, 2004).

3.2 Overview of the research design

This pragmatically guided study employed a *mixed-method research design*, involving both qualitative and quantitative research methods. According to Creswell (2014), with a mixed-method approach, interpretations are made based on the integration of both types of data in order to understand the complexities within social science research. Simultaneously combining and mixing multiple methods not only helps the researcher to use the strengths of some methods but also to counterbalance their weaknesses. This results in a valuable strategy that provides comprehensible empirical evidence for the

research (Axinn & Pearce, 2006). In this way, "corroboration between quantitative and qualitative data enhances the validity of the findings" (Robson, 2011, p.167).

The research design for my study employed a mixed-method approach for several reasons. The first reason was that the research was initiated with the aim of understanding a particular *context.* Therefore, "the combination is rationalized in terms of qualitative research providing contextual understanding coupled with either generalizable, externally valid findings or broad relationships among variables uncovered through a survey" (Bryman, 2006, p. 106). To this end, while all three research questions combined qualitative and quantitative data in order to obtain contextual and generalizable data, the third research question also combined qualitative and quantitative data in order to develop contextual understanding of the broad relationship between variables in the conceptual framework.

The second reason was related to *complementarity* (Greene, Garacelli & Graham, 1989, Morgan, 2019), in which the basic strategy is "to create a division of labor, so that each method offers something that would be difficult for the other to produce" (Morgan, 2019, p. 8). Qualitative and quantitative methods were combined in order to use the results from one part of the findings to enhance and illustrate other parts. To this end, while quantitative data help to confirm proposed relationships within a conceptual framework (chapter 2), qualitative data allow these relationships to be illustrated and, and in this way to validate the findings. Equally, quantification of qualitative data provide support for 'warranted assertions'.

The third reason was related to the need for *development* (Greene, Caracelli & Graham, 1989), particularly the need to use qualitative data to inform the analysis of quantitative data so that the measurement scales used in quantitative analysis were close to the research context. To be precise, the constructs within the conceptual framework, that is, knowledge sharing and receiving, the need for professional connectedness and knowledge sharing self-efficacy were firstly the object of quantitative descriptive analysis in parallel with the thematic analysis of qualitative data. The latter analysis, in turn, informed the modification of the constructs at the stage of analysis, resulting in deletion of some of the items in order to reflect the research context.

The study is a *convergent parallel design*. This was because the quantitative and qualitative strands were prioritised equally and the data collected independently (Creswell & Clark, 2011) with integration at the data analysis stage, described by Green (2007) as 'blending', as well as at the stage of interpretation. Therefore, in line with identified research questions and conceptual framework, the study of mixed-method research design can be presented visually in the following way (figure 3.1).

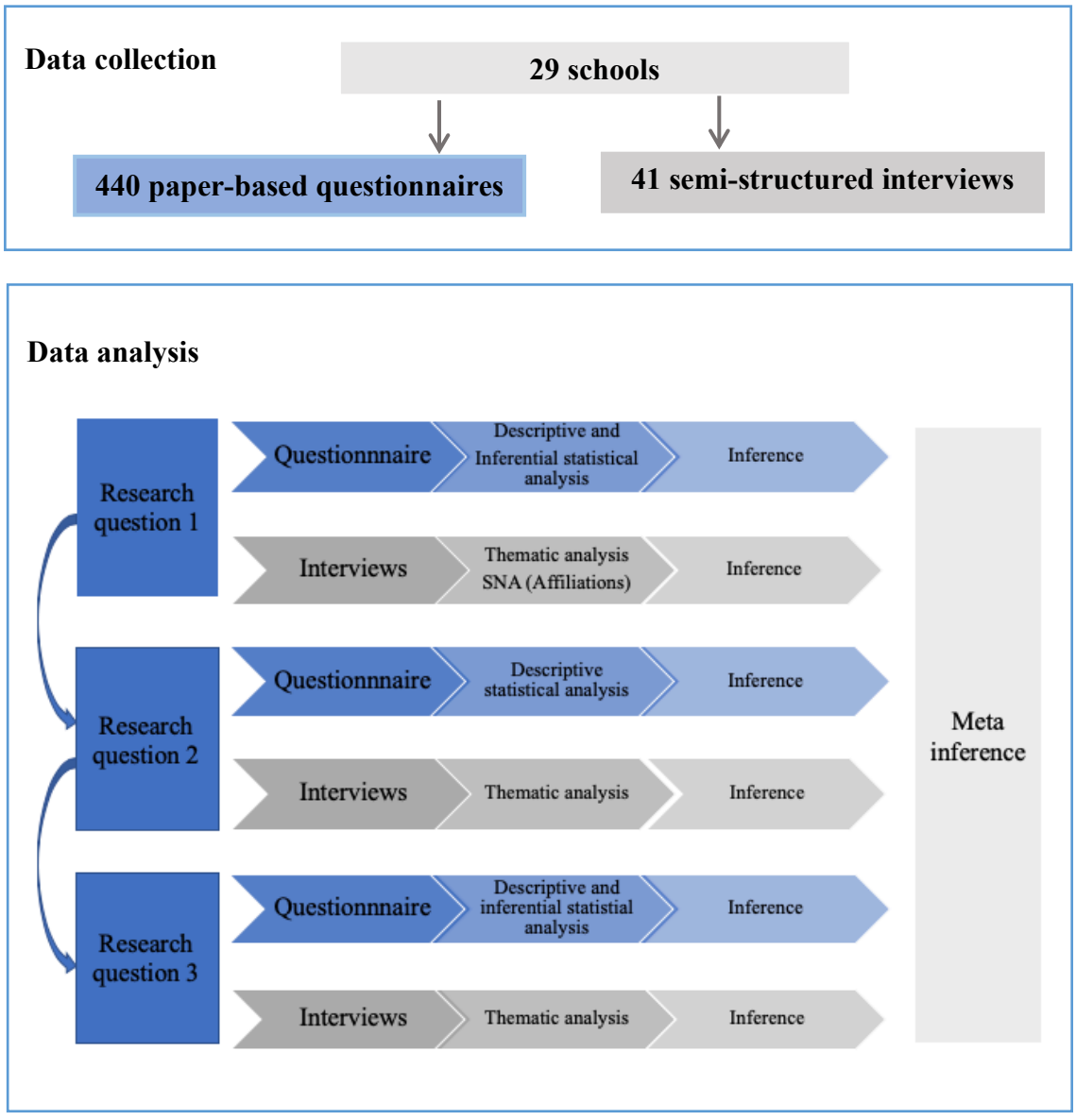


Figure 3.1: Overview of the research design

The overview of the research design provided in figure 3.1 illustrates that all research questions were explored during the visits to 29 schools (the sampling of which will be

described in section 3.4.2) by means of both quantitative and qualitative data collection methods, specially by means of a paper-based questionnaire and face-to-face interviews respectively. The reason that these data collection methods were selected for this research project is discussed in section 3.3, and the data collection processes with the help of these methods are described in section 3.4. In particular, the process of gaining access and reflection on my positionality as a researcher is discussed in section 3.4.1 and the administration of data collection is described in section 3.4.3. Data for analysis in the present study were obtained from 440 questionnaires and 41 interviews with the help of purposive, convenience and probability sampling techniques, which will be described in section 3.4.2 along with a description of the research participants.

The visual representation of data analysis in the research design shows that each research question was addressed by means of both quantitative and qualitative data collection methods, and questionnaire data were analysed separately from those collected from the interviews. At the same time, both qualitative and quantitative analysis informed each other during the process of data analysis for the second and third research questions. In particular, measures for producing descriptive statistics in the analysis of the second research question were modified in accordance with the results of the thematic analysis of the same research question. Equally, the codes used in the thematic analysis of the third research question were theoretically driven in line with measured concepts in the inferential statistical analysis of the third research question. The detailed procedures involved in these data analysis processes are presented in section 3.5.

Overall, the design involved a clear separation between two methods based on their ability to contribute to the findings relating to each research question. In particular, with the aim of achieving complementarity, the findings obtained from the questionnaire and interview data in relation to each research question were compared before revealing final findings for each research question as the result of finding "useful points of connection" (Morgan, 2007, p.71) between quantitative and qualitative data. In this regard, Morgan (2019, p. 6) argues that "triangulation depends on the comparison of results from qualitative and quantitative studies that attempt to answer the same research question(s)".

It should be acknowledged that conducting both qualitative and quantitative research could be, on the one hand, considered a limitation of the study as it was conducted by a single researcher, with each research strand requiring certain knowledge, skills and ways of thinking. On the other hand, it allowed deep immersion in the data and an opportunity to reflect during each data analysis strand as a result of insights, obtained from the opposite strand. At the same time, although from a methodological point of view, both qualitative and quantitative research being carried out by a single researcher could be considered a weakness of the research project, from the perspective of the learning journey, within the framework in which the study was conducted (PhD programme), the present mixed-method study was a splendid opportunity not only to understand an interesting research phenomenon, but also to learn research methods that were new to me.

3.3 Data collection methods

Nowadays, the majority of empirical studies on virtual professional communities "use a methodology consisting of qualitative case studies and focused on understanding particular environments, but they do not yet explore large networks or communities with hundreds of participants" (Macià & García, 2016, p.304). These studies tend to be linked with pre-service and in-service teacher training environments or government initiated projects with limited numbers of participants, offering researchers an easily accessible sample (Robson, 2016). This trend could be associated with various challenges in relation with access to participants. Therefore, although ethical considerations are addressed in other parts of this chapter, the following section is highlighted with a sub-title as ethical and practical considerations informed the methodological choices of this study.

3.3.1 Ethical and practical considerations

Although posts of virtual community members are publicly available online, this does not mean that this content can be used by researchers without taking account of the privacy of the people being researched (Lüders, 2015). There is an ongoing debate between scholars as some of them argue that, if materials are public, there is no need for consent, whereas others believe that there is a need for prioritisation of the participants' intentions: they may not wish to release their materials to a public audience (Henderson, Johnson, & Auld, 2013). Such lack of consensus has been reiterated by Ethical Guidance for

Educational Research of the British Educational Research Association (BERA), that has been greatly extended in 2018 in comparison with the previous versions due to "the rise of social media and online communities" (BERA, 2018, p. iii).

> In many cases the producers of publicly accessible data may not have considered the fact that it might be used for research purposes, and it should not be assumed that such data is available for researchers to use without consent. There is no consensus, however, as to whether those in online communities perceive their data to be either public or private, even when copyrights are waived
>
> (BERA, 2018, p.10).

However, even if there is a commitment to obtain consent forms from all the participants, it may be difficult, resource-intensive and practically not possible; moreover, in most cases participants in online environments do not wish to be studied without their consent, and what is more, they object to being researched (Elgesem, 2015). In this regard, while BERA (2018, p.11) advocates the need to consider consent in relation to "each and any online data-source, with consideration given to the presumed intent of the creators of online content, the extent to which it identifies individuals or institutions, and the sensitivity of the data", Segadal (2015, p. 44) suggests that "it certainly can be legal to conduct research on personal information obtained from the Internet without consent, as long as the researcher can justify the necessity and the benefits for the public clearly outweigh the disadvantages for the individual".

Similarly, there is a need to consider the vulnerability of the people being studied due not only to the sensitivity of the topic, but also to the fact that those who turned out to be participants in the research may consider it an infringement, which may have a negative influence on their interest in future participation (Elgesem, 2015; Lüders, 2015). In the light of the aim of this research, this could be considered the main obstacle, as the ultimate goal was to facilitate knowledge sharing within virtual professional communities of teachers in Kazakhstan. Therefore, based on the above-mentioned ethical considerations, the data collection methods in this study were based on self-reported information provided by the research participants.

At the same time, although the decision in favour of self-reported data was made in response to the ethical and practical considerations discussed above, one of the main reasons that informed such a choice was that the research questions within the conceptual framework aimed to explore the beliefs, needs and experiences of teachers engaged in virtual professional communities. In other words, the decision was informed by the nature of the conceptual framework, an exploration according to which is difficult with a help of computational or content analysis.

Finally, the choice to use self-reported data was made, due to the overarching question as well as the first research question, which aimed to explore the nature of virtual professional communities. Exploring a particular platform or a particular group within a social media platform was considered to be in contradiction to the exploratory nature of the research question. Moreover, along with the exploratory nature of the research that informed the decision not to select a particular social media platform, the decision was also associated with the difficulty in making a clear division between them because, as suggested by Van Dijck (2013, p. 8) social media platforms are constantly developing in a "continuous battle to dominate a segment of online sociality".

Therefore, in accordance with the conceptual framework and research questions of the present research, as well as ethical and practical considerations, the study utilised qualitative and quantitative data collection methods that collected self-reported responses of research participants by means of face-to-face interviews and a paper-based questionnaire.

3.3.2 Paper-based questionnaire

In accordance with the research questions, and ethical and practical considerations, the quantitative data collection method was a paper-based questionnaire. Although the research question was concerned with digital technologies, instead of conducting an online survey the choice was made in favour of a paper-based questionnaire for the following reasons.

The first reason for conducting a paper-based questionnaire in the presence of the researcher was related to the opportunity to explain the form of sociality within social media, and hence to clarify the concepts of virtual professional networks and communities, and in this way to ensure that all research participants had the same understanding. The second reason was related to the desire to provide respondents with an opportunity to clarify the questions in the questionnaire in order to facilitate a good response rate and to ensure the completion of all questions (Cohen, Manion & Morrison, 2015).

Finally, preliminary face-to-face explanations of the research during the administration of the paper-based questionnaire were considered to be an opportunity to provide more information regarding the research project and the researcher in order to develop trust between researcher and respondents, and, consequently, openness of the respondents when answering the questions. At the same time, since the second and third research questions were related to knowledge sharing, it was important to consider the opinion of 'lurkers', who being hesitant to make a post, might hesitate to answer questions online as well. In other words, I thought that passive participants in virtual professional communities could also be passive when it came to respond online questionnaire. Therefore, by considering procedures of obtaining responses from passive participants in virtual professional communities, I was aiming to contribute to the findings relating to knowledge sharing.

To lend support to the decision to use a paper-based questionnaire in this project was also a pilot of questionnaire was administrated. The questionnaire was developed in English language based on existing research in order to check that research participants would understand the translation of the questionnaire in Kazakh and Russian, so the translated questionnaire was piloted with 18 teachers in one rural school. As a result of noting the queries of the participants while they were answering the questions, the major conclusion after the pilot was the need for an introductory conversation with the research participants in order for them to have a common understanding of 'virtual professional networks and communities', as reflected in the research literature that reported that teachers use a variety of terminology. In other words, even if the questionnaire provided a definition of virtual professional networks, it became evident that conversation with teachers before

the actual process of answering questions was a useful exercise not only to ensure the same understanding of the research object, but also to establish some degree of trust that was required for respondents' participation.

A paper-based questionnaire was administered in order to generate the findings related to all three research questions, particularly with respect to participation in virtual professional communities and the nature of knowledge sharing within them, as well as the broad relationship between knowledge sharing, the need for professional connectedness and knowledge sharing self-efficacy (Appendix 1). To this end, the first part of the questionnaire involved questions relating to the background information; and the second part involved questions concerning the participation in virtual professional communities, including the measurement of the concepts embedded in the conceptual framework. However, since the latent constructs of the questionnaire in the conceptual framework were modified as a result of concurrent analysis of the interview data, the latent constructs measured by the present questionnaire are presented in the last section of the methodology chapter on relation to the analysis of the questionnaire (section 3.5.3).

Having identified a paper-based questionnaire as one of the data collection methods, I decided to collect this quantitative data by means of school visits, although I could have done it within the in-service teacher training organization. The decision was informed by the aim to reach a maximum distributed sample of the population for both the quantitative and qualitative data collection processes.

3.3.3 Face-to-face Interview

While a paper-based questionnaire was identified as the quantitative data collection method, semi-structured face-to-face interviews with teachers on a voluntary basis was identified as the qualitative data collection method. Due to the considerable distance between schools in the research context, particularly between rural schools with a small number of teachers, I decided to hold interviews with teachers once there was an opportunity to administer the paper-based questionnaire. Therefore, employing a mixed-method approach and having considered the practicality of the research implementation, the study had a convergent parallel design, whereby a paper-based questionnaire was conducted with the whole sample of participants and semi-structured face-to-face interviews were conducted with a subset of individuals from the sample.

Providing the rationale for semi-structured face-to-face interviews in the present study necessitated, firstly, explaining the need for interviews as a source of self-reported data about the research participants. To this end, it should be stated that I selected interview as the qualitative data collection method in accordance with the rationale for the present mixed-method research (section 3.2), and hence the decision was informed by the following two factors. Firstly, with the aim of complementing the generalizable and confirmatory nature of the findings from the quantitative data collection, interviews were conducted in order to obtain contextual rich insights into the needs, beliefs and experiences of teachers, who were members of virtual professional communities. At the same time, the interview was used in order to generate contextual qualitative data to inform the analysis of quantitative data so that measurement scales of the questionnaire in the research would reflect the contextual findings.

At the same time, providing the rationale for semi-structured face-to-face interviews in the study necessitated an explanation of the reason for using a semi-structured interview, in which the researcher uses interview guide with identified in advance topics to cover as well as questions' order, however, "the wording and order are often substantially modified based on the flow of the interview, and additional unplanned questions are asked to follow up on what interviewee says" (Robson & McCartan, 2016, p.285).

It should be noted that one of the first reasons for conducting semi-structured interviews was related to the research design and the research questions of the present study. On the one hand, the mixed-method research design with the conceptual framework provided the scope for the interview questions, but, on the other hand, the research questions were exploratory in nature. Semi-structural interviews allow for a focused and structural conversation with research participants, using questions on an area identified in advance and opportunity to generate detailed and nuanced data with the help of follow-up and probing questions (Rubin & Rubin 2005), thereby, providing an opportunity to collect "reliable, comparable qualitative data" as well as "identifying new ways of seeing and understanding" (Cohen & Crabtree, 2006, para. 5).

Equally, the parallel data collection process used in the present study also contributed to the decision in favour of semi-structured interviews, as it is the most suitable type of interview when there is no opportunity to interview participants more than once (Cohen & Crabtree, 2006). In other words, it could be stated that I selected semi-structured interview as a source of qualitative self-reported data in the present research due to the mixed-method parallel nature of research design.

The schedule of semi-structured face-to-face interviews in the study consisted of questions related to all three research questions and therefore included the following parts: the first part was composed of questions related to general background information about the research participants. The second was concerned with their membership of virtual professional communities and the reason that they started to use social media for professional networking. The third part of the interview schedule was devoted to the members of their virtual professional networks and their experience of it, and the last part of the schedule aimed to explore the nature of knowledge sharing (Appendix 2).

Overall, summarising this section devoted to data collection methods, it could be concluded that a paper-based questionnaire and face-to-face interviews were identified as quantitative and qualitative data collection methods, respectively, in accordance with the conceptual framework and the research questions as well as ethical and practical considerations.

3.4 Data collection process

Having presented in the previous section the data collection methods, the present section describes the data collection process in accordance with the practical and ethical considerations. According to table 3.1, which provides an overview of the timeframe, the data for the present research project was collected within a six-month period commencing in November 2017 and finishing in April 2018.

The overview of the fieldwork timeframe provides a visual description of the data collection process within the parallel mixed-method research design, with the preliminary process involving gaining access to research participants and sampling. Although, as

presented in table 3.1, all the procedures were conducted during the whole period of the fieldwork, this section will present them in a sequential order.

Table 3.1: *Overview of a fieldwork timeframe*

	November 2017	December 2017	January 2018	February 2018	March 2018	April 2018
Procedures	Obtaining access					
	Sampling					
		Administration of the questionnaire				
		Conducting the interviews				

Before presenting the processes of quantitative and qualitative data collection, this section aims to describe the process of gaining access to research participants, including the researcher's positionality as well as a description of the process of sampling and the participants of the study.

3.4.1 Obtaining access and research positionality

> The institutions and settings within which the research is set also have an interest in the research, and ought to be considered in the process of gaining consent. Researchers should think about whether they should approach gatekeepers before directly approaching participants, and about whether they should adopt an institution's own ethical approval and safeguarding procedures; this is usually a requirement (BERA, 2018, p.10).

In this regard, since the research design of the present study involved visits to the schools in order to conduct qualitative and quantitative data collection, gaining access to the school was the first step in obtaining access to research participants. However, due to the busy schedule of the schools and my positionality as an outsider to the schools, I was worried that it would be difficult to persuade school principals to allow my visits to their schools in the context of the centralised governance of secondary education system. Equally, due to the existing school management system, I considered that governing bodies of the schools should be aware of the research taking place in these institutions. In

this regard, it should be noted that Kazakhstan has central planning and a detailed system of norms within the governance of the education system (OECD, 2018).

In accordance with the Law on Education (2007), the Ministry of Education and Science of the Republic of Kazakhstan, together with agencies and institutions subordinated to the ministry, is responsible for the implementation of the state educational policy, including the development and approval of State Standards for Primary General and Secondary Education and coordination of its delivery. LEAs at the regional and district levels are responsible for provision of education in schools, including allocation and management of resources as well as organizational and methodological support for schools.

Therefore, since the LEAs are responsible for provision of education in schools and this research design involved accessing the school and collecting data during school working hours, I decided to start approaching participants through a request permission from the Head of Regional LEA for schools to participate in my research project. Based on this decision, I sent an official letter to the LEA at the regional level, requesting permission to conduct research in an identified region (Appendix 4), and simultaneously, signed up to visit the LEA within time available for public visits, when I managed to introduce myself and the research project.

Having obtained official written permission in the form of letters to the two LEA district identified as a result of proximity, I visited them both before approaching schools. As a result of explaining the aim of my research project, I received official written permission to approach the school principals requesting them to allow me to enter their schools to recruit research participants on a voluntary basis and conduct data collection at the schools, avoiding any harm to the educational process within the schools. It should be noted that the district LEA were not involved in the selection of the schools, as identifying and approaching the schools were my personal responsibility as one of the steps to ensure anonymity of the participants. It should be noted that two (one in rural and one at Regional level) of the approached schools refused to participate in the present study.

Obtaining permission to visit schools from regional and district LEAs as well as school principals could be considered a three-gate process of gaining consent before approaching research participants. In view of this, on the one hand, it could be argued that this procedure helped me to have an access to a great number of research participants, but, on the other hand, in a sense, such permissions could facilitate involuntary participation and the process of participation could be seen as an additional top-down initiative. Bearing this in mind, when inviting teachers to participate in the research, I stressed in the explanation of the process that participation was voluntary and anonymised. In this way teachers understood that although they had participated in the research sharing session, they might opt not to participate in the research itself. Hence, only those who agreed and signed the consent form (Appendix 3) were research participants in the present study.

However, although appropriate consent from all stakeholders was received, there was a clear understanding of the need to create the conditions for openness and willingness of teachers to participate, particularly, in this research context in which, as suggested by Silova, Sobe, Korzh & Kovalchuk (2017, p.2) "even some of the best methodologically conceived research can easily fail to capture post-socialist experiences and realities situated in these complicated socio-cultural and political contexts". In view of this, it could be argued that my positionality played a major role in the data collection process.

In this regard, the best way to reflect on my positionality in the present study is to consider it in terms of the concepts of insider and outsider, as expressed by Crossley, Arthur and McNess (2016, p. 34), namely that "we are neither complete observers nor complete participants but often working in that 'third space' in between". This seems to best describe my positionality and the rest of the section will be devoted to the reflection on my 'in-between' research positionality. To do so, this positionality will be considered in terms of two layers.

The first layer of this 'in-betweenness' could be described in relation to my cultural and educational background. Being educated (school and bachelor's degree) and having worked in Kazakhstan, I was immersed in Western academic discourse during post-graduate studies. In this regard, Gu (2016, p.200) suggests that

> exposure to different cultures, different pedagogies and different worlds challenges emotionally, psychologically and intellectually international students' 'hidden' cultural and habitual values and behaviors. As a result, most experience transformational changes – especially in terms of their broadened interests and worldview, and transnationalised new competences, skills and connections.

On the one hand, I have prior knowledge of the system and the culture, which provided an opportunity to identify something that an outsider would find difficult to observe or understand, but on, the other hand, being immersed in a different academic discourse and culture provided me with an opportunity to consider what insiders could take for granted in relation to a research topic.

The second layer within the insider-outsider continuum (Hellawell, 2006) of my positionality was related to the way I was perceived by research participants. Strengthening my insider position was related to my personal and professional background, that I shared during personal introductions. In this regard, the fact that I studied in the village school, located in similar conditions in the north region of the country, was one of the potential reasons that I felt that most of the teachers easily treated me as 'one of them'. To this end, they were pleased that a former pupil of the village school similar to theirs was a holder of the Bolashak International Scholarship (Bolashak.gov.kz). As the result, the school administration in two of the schools organized a meeting with the students so that I could answer their questions and motivate them to undertake further study. In this regard, my position helped me to increase participation in the study and in some interviews facilitated the openness of the interviewee.

Moreover, revealing my professional experience including, in particular, being part of the in-service teacher professional development system also helped me to establish some degree of trusting relationship. As a result, in some of the schools, English language teachers were proactive in establishing a dialogue with me use that as an opportunity to discuss subject-related issues; in other schools the leadership teams of the schools were proactive in terms of discussing issues related to school-based professional development

and asking for some resources in this regard. In a sense, I believe that such 'insiderness' facilitated the process of establishing trust. In this regard, the requirement to develop a relationship of trust, particularly in the post-socialist context has been reiterated by Beresniova (2017, p. 15) pointing out that "permission [is] not the same thing as participation".

At the same time, to the research participants I was an outsider due to the fact that I was visiting schools in order to conduct research. In this regard, in relation to the research context Silova et al. (2017, p.2) caution that "formal interviews and focus groups can reproduce official dogmas or lead to extremely shallow data, especially when participants feel a collective pressure to protect their communities from outside influence". Moreover, there was a risk that teachers would consider me to be an evaluator of their work, having been trained in CoE courses. In other words, on the one hand, as described above, my relationship with the in-service teacher professional development system could help me to establish some degree of trust in the relationship, but on the other hand, could potentially be associated with teachers' sense of being evaluated.

Therefore, with the aim of mitigating these anticipated risks, after presenting my personal and professional background, I explained that teacher evaluation was not part of research and that I was interested in their opinions, which would be anonymised but would help me to develop a deeper understanding of the processes to which I had professional commitment and ownership due to the fact that I was interested in conditions for teacher learning. It could be stated that achieving balance with respect to the insider and outsider continuum in the present research project was one of the main factors contributing to the process of gaining access to the research participants, and the subsequent recruitment and facilitation of openness within questionnaire and interview responses. All of these consequently contributed to the process of capturing the beliefs, needs and experiences of teachers in relation to the research object.

3.4.2 Sampling and participants

The participants in this mixed-method study were identified as a result of multi-level mixed-method sampling (Teddlie & Tashakkori, 2009). Multi-level mixed method sampling in the present study was comprised of three general levels. The first level

involved the sampling of the region, the second level, the sampling of the schools within the region, and the third level consisted of sampling of the teachers within identified schools. This section describes in detail the sampling procedures and research participants, and at the end, presents an overview of the present multi-level mixed method sampling and research participants recruited within the present sampling procedure.

With the aim of achieving representativeness (Teddlie & Tashakkori, 2009), the first level involved *typical-case-purposive sampling.* In this stage of the sampling procedure, the total population was divided into five clusters from a geographical point of view, namely, east, west, north, south and central Kazakhstan. Within those clusters, the north was selected as all regions in this cluster had the greatest number of small schools (OECD, 2015), which were identified in Chapter 1 as the schools, where teachers would potentially benefit most from the process of developing social capital within a social media space. However, due to the time constrains of the PhD study, only one of the regions with an identified cluster was selected for recruiting participants from the regional, district and rural schools, and in order to avoid identification, the selection process of the region within identified cluster is not presented.

The second level involved sampling of the schools within the region by means of *cluster-probability sampling*. To this end, the schools were divided into three clusters, namely, rural, district and regional. The number of schools within each cluster to generate the sample was identified in accordance with the proportion of the schools in the region. In order to avoid identification of the region the percentage of the sampling procedure is not presented; however, it should be noted that the required number of research participants was guided by Hair, Black, Babin and Anderson (2014) recommendation that for confirmatory factor analysis of collecting more than 300 complete questionnaires should be collected.

Therefore, as a result of *cluster-probability sampling* procedure, 29 schools were identified as the number to be contacted for the research project, with one school in the regional centre, three schools in the district centres and 25 schools in rural areas. Equally, due to the constrained scope of the research project, the number of districts within the region was limited to two. It was decided that two districts should be close to each other,

for practical reasons, and should provide a school sample with Kazakh, Russian and mixed language of instruction. To this end, the second level of multi-level mixed-method sampling procedure involved *volunteer-convenience sampling,* because in this level, the sample was generated on the basis of convenience for the researcher and the voluntary agreement of the participants as well.

Therefore, having obtained permission to approach the schools for recruitment of the research participants, as described above (section 3.4.1), in two districts I identified the list of rural schools to be contacted based on the highest number of teachers in schools and proximity in terms of travelling. In other words, firstly, I identified the schools with the highest number of teachers in order to be able to generate the required sample for quantitative analysis, but then added schools with smaller number of teachers due to their proximity and different working conditions. Two schools in one district centre and one school in another district centre were selected, based on the highest number of teachers within these district schools, while the school in the regional centre was selected based on convenience sampling.

Having identified the list of schools, I sent an email to the school email address, available on the website of the regional LEA, with a request for participation in my study. Along with the request I shared information regarding the research and the letter from the district LEA addressed to any school principal in the particular district to allow me to recruit research participants within the schools. However, in order to ensure that schools did receive my letters and to provide more information by means of discussion, I called each school.

As a result, in some schools I managed to talk with school principals and in others, with the deputy principal, and therefore managed to speed the process of recruitment and negotiate with schools the most suitable time to assemble teachers in order to present my research and invite them to participate. It should be noted that in the process of generating a *volunteer-convenience* sample, two of the approached schools were not eager to participate in the study (one in the rural area and one in the regional centre) and therefore these were substituted by different schools. Overall, it could be summarised that the second level of sampling consisted of cluster-probability and volunteer-convenience

sampling procedures, as a result of which 29 schools were identified (one school in a regional centre, three schools within two district centres and 25 schools being rural schools of two district centres) and agreed to participate in the study.

The final third level of sampling is related to the sampling of the teachers in the identified schools for participation in quantitative (paper-based questionnaire) and qualitative (face-to-face interview) data collection processes in the research project. To this end, in view of the ethical consideration (BERA, 2011, p. 5), which stipulates the need for "voluntary informed consent to be the condition in which participants understand and agree to their participation", the sampling within this level was identified as *volunteer-convenience sampling*. The reason for the present sampling procedure to be identified as *volunteer-convenience sampling was* because both questionnaire and interview participants were recruited on a voluntary basis.

Starting with recruitment of teachers to complete the questionnaire, those in the schools that were visited were also asked for further participation in the research, in the form of a face-to-face interview. At the same time, due to the fact that regional level was presented only by one regional centre school, with only one teacher volunteering to participate in a face-to face interview, an additional four teachers from other regional-centre school were recruited while they were participating in one of the in-service teacher training courses.

Following described the multi-level mixed-method sampling procedure that involved purposive and probability sampling, the study recruited 444 teachers to fill in a paper-based questionnaire and 41 teachers to participate in face-to-face interviews on a voluntary basis. On the one hand, recruitment on a voluntary basis allowed the creation of conditions for honest responses and adhered to the ethical research guidance; on the other hand, it could facilitate the problem of biased responses (self-selection) due to the fact that that volunteers might represent the opinions in active participants of virtual professional communities.

Questionnaire participants

The process of recruiting the research participants as well as preliminary screening and cleaning of the data, resulted in a sample of 440 teachers, who completed the

questionnaire. Table 3.2 demonstrates the response rate within each school, with an average 50 per cent response rate across the whole sample. The response rate in some schools could be explained by the absence of teachers at time of the visits and by teachers' busy schedules or their reluctance to participate.

Table 3.2: Number of the questionnaire respondents

N	School location		Education	Instruction Language	N of teachers	N of respondents	Response rate
1		Town	GUS	Mix	80	30	38%
2		Town	GUS	Kazakh	70	22	31%
3		village 1	BS	Russian	20	12	60%
4		village 2	BS	Russian	11	9	82%
5		village 3	GUS	Mix	47	19	40%
6		village 4	GUS	Mix	26	20	77%
7	D1	village 5	GUS	Kazakh	23	16	70%
8		village 6	GUS	Kazakh	22	15	68%
9		village 7	GUS	Kazakh	26	13	54 %
10		village 8	GUS	Mix	42	17	40%
11		village 9	GUS	Russian	24	12	50%
12		village 10	BS	Russian	14	11	79%
13		village 11	GUS	Russian	20	17	85%
14		village 12	GUS	Mix	36	8	22%
15		village 13	GUS	Mix	30	16	53%
16		Town	GUS	Kazakh	30	18	60%
17		village 1	GUS	Kazakh	20	14	70%
18		village 2	GUS	Kazakh	20	16	80%
19		village 3	GUS	Kazakh	23	13	57%
20	D2	village 4	BS	Russian	16	11	69%
21		village 5	GUS	Mix	29	18	62%
22		village 6	GUS	Mix	27	14	52%
23		village 7	BS	Russian	11	8	73%
24		village 8	GUS	Mix	38	12	32%
25		village 9	GUS	Mix	40	25	63%
26		village 10	Basic	Mix	17	9	53%
27		village 11	GUS	Mix	36	20	56%
28		village 12	GUS	Mix	20	9	45%
29	Regional Centre		Secondary	Mix	70	16	23%
			Total		888	440	50%

Note: BS – Basic (lower) secondary education;
GUS – General upper secondary education.

The distribution of the research participants in relation to the gender illustrates that 83.6 per cent of questionnaire respondents were female (table 3.3) which reflects the actual state of the country-wide population of teachers, as 80.3 per cent of teachers in 2017 were

female (IAC, 2018). As for age distribution of the participants, table 3.4 demonstrates that the majority of questionnaire respondents were between 30 and 49 years old, which in its turn reflects the actual age distribution of the teaching force in 2017 (IAC, 2018). The comparison of age distribution between research participants and the overall population (table 3.4) suggests the representatives of the questionnaire sample within this criterion.

Table 3.3: Gender of the questionnaire respondents

	Gender	Frequency	Percentage	Valid Percentage
Valid	Female	368	83.6	83.8
	Male	71	16.1	16.2
	Total	439	99.8	100.0
Missing	System	1	.2	
Total		440	100.0	

Table 3.4: Age of the questionnaire respondents in comparison with country-wide population

		Research participants		Country-wide in 2017
Age	*Frequency*	*Percentage*		*Percentage*
Under 25	42	9.5%	19.3%	19.9%
25-29	43	9.8%		
30-34	58	13.2%	27.1%	28.5%
35-39	61	13.9%		
40-44	82	18.6%	33.4%	27.1%
45-49	65	14.8%		
50-54	46	10.5%	17.5%	21.6%
55-59	31	7.0%		
60+	12	2.7%	2.7%	2.9%
Total	440	100%	100%	100%

In line with the sampling procedure the highest number of respondents in the quantitative data collection process (84 %) were from the schools located in the rural area (table 3.5).

Table 3.5: Place of work of the questionnaire respondents

Place of school	Village	District centre	Regional centre	Total
Number of respondents	372	84.5	16	440
Percentage of respondents	52	11.8	3.6	100.0

Figure 3.2 and table 3.6 demonstrate the distribution of the questionnaire participants according to the teaching subject. The majority of respondents were teachers in primary schools and teachers of Kazakh or Russian language and literature, followed by mathematics and computer science and science strands, with the latter including geography, chemistry, biology and physics.

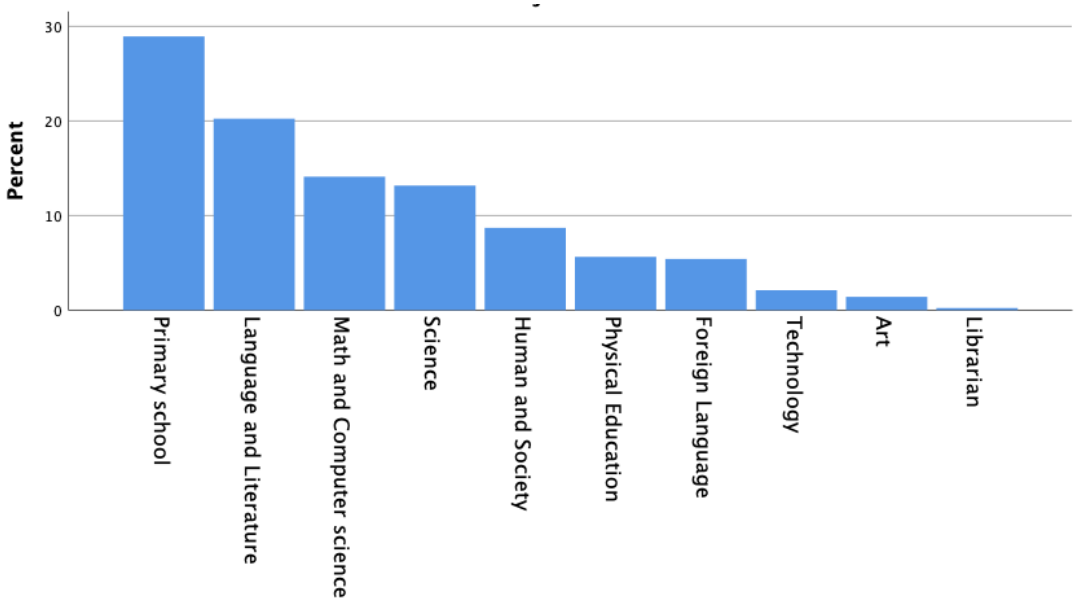


Figure 3.2: Teaching subject of the questionnaire respondents

Table 3.6: Teaching subject of the questionnaire respondents

Subject Strand	Frequency	Percentage	Valid Percentage
Primary School	123	28.0	28.9
Language and Literature	86	19.5	20.2
Foreign Language	23	5.2	5.4
Math and Computer Science	60	13.6	14.1
Science	56	12.7	13.2
Human and Society	37	8.4	8.7
Art	6	1.4	1.4
Technology	9	2.0	2.1
Physical Education	24	5.5	5.6
Librarian	1	.2	.2
Total	425	96.6	100.0
Missing System	15	3.4	
Total	440	100.0	

Interview participants

Reflecting the quantitative data collected, the number of interview participants was mostly represented by teachers working in rural schools (31 interview participants, recruited from 23 rural schools), five teachers recruited from schools in two district centres, and five teachers from schools in the regional centre, representing five different schools. Still, reflecting the quantitative data, the number of female participants in face-to-face interviews accounted for 85 per cent (35 out of 41) of participants, while only 15 per cent (6 out of 41) of participants were male. Figures 3.3 and 3.4 present distributions of interview participants' teaching experience and teaching subject, and in a sense, it could be suggested that the variation in interview participants in terms of their teaching experience and teaching subject are represented by the great range of views, including five deputy school principals.

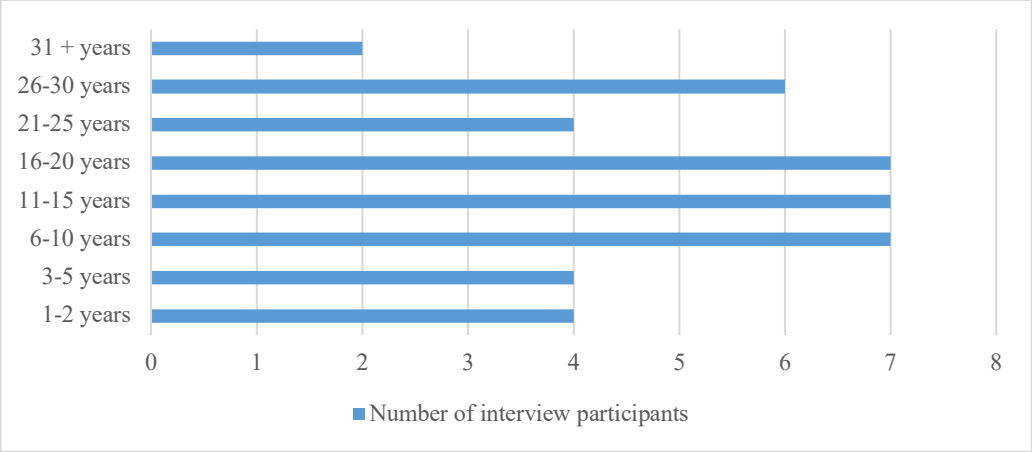


Figure 3.3: Teaching experience of interview participants

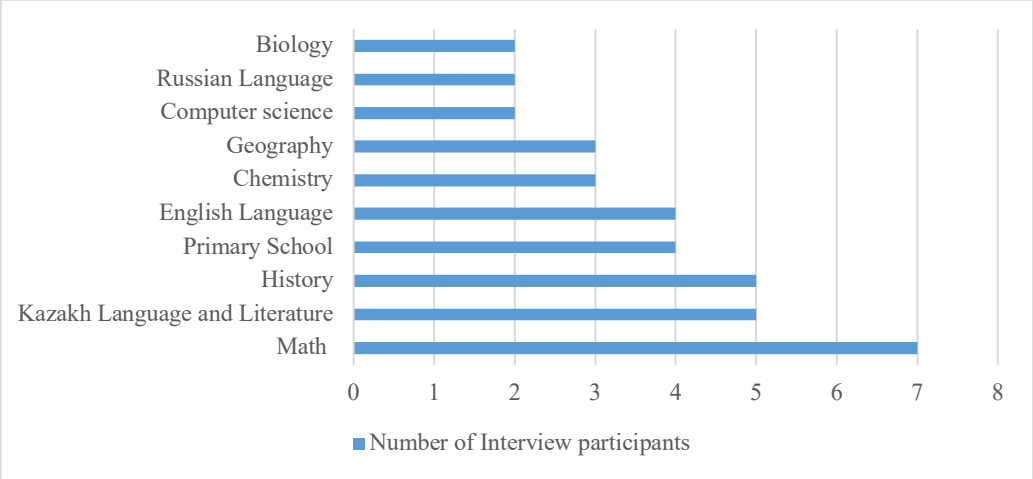


Figure 3.4: Teaching subject of interview participants

Overview of the sampling and participants

Overall, the sampling and the participants involved both quantitative and qualitative data collection processes were identified by means of multi-level mixed-method sampling procedures, which could be summarized visually in the following way (figure 3.5).

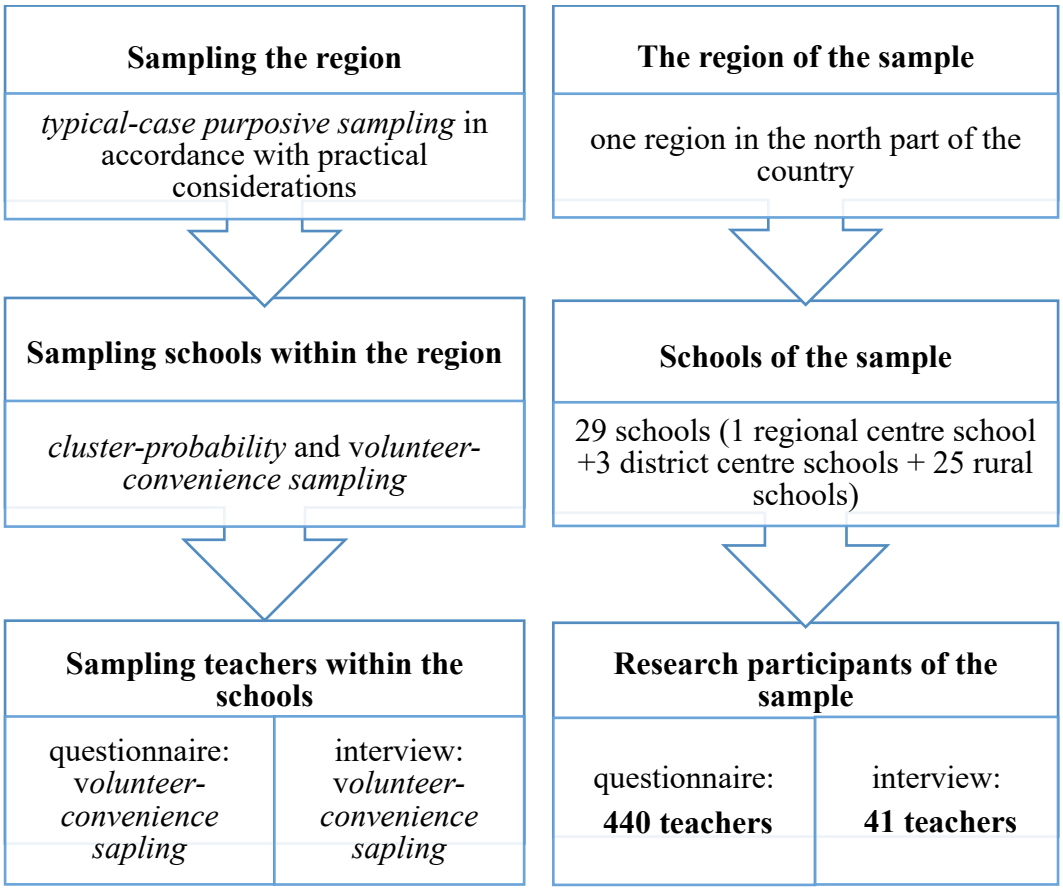


Figure 3.5: Multi-level mixed-method sampling and participants

The overview of the sampling procedure demonstrates that the sample could have some limitations in relation to its representativeness with respect to both questionnaire and interview respondents, all of whom were recruited on a voluntary basis. On the one hand, the voluntary sampling procedure allowed the present study to be conducted in accordance with ethical consideration of educational research (BERA, 2018) and to obtain complete responses in the questionnaire; on the other hand, it could have generated self-selection bias, which is usually a problem when the research participants themselves decide whether to participate or not (Olsen, 2011). To this end, the interview respondents could be mostly represented by teachers who were proactive within virtual professional communities and therefore could be over-representative of those with proactive

knowledge sharing practice. Equally the questionnaire participants could be represented by active users of social media, and in this way present an exaggerated picture of the level of social media use for professional networking. However, it should be noted that the age distribution of the questionnaire respondents reflects the actual age distribution of the teaching force in 2017 (see above).

Finally, typical-case purposive as well convenience sampling procedures in the present multi-level mixed-method sampling strategy did not allow me to generalize to the whole region, cluster or the whole country, and therefore it is not possible to claim to be able to explain the whole nature of research phenomenon in the research context. In this regard, Morgan (2007) argues that a pragmatic approach ignores the requirement to opt for one of the extremes when considering the results of research to be either completely context-specific or to be more generalizable. From pragmatic perspectives

> an important question is the extent to which we can take the things that we learn with one type of method in one specific setting and make the most appropriate use of that knowledge in other circumstances. Once again it involves a process of working back and forth, in this case between specific results and their more general implications (Morgan 2007, p.72).

Borrowing the idea of transferability of research results from Lincoln and Guba (1985), Morgan (2007) argues that transferability has a highly pragmatic orientation related to the utility of the knowledge that researchers produce as opposed to abstract consideration of whether or not it is possible to generalize the findings. Therefore, he concludes that in pragmatically guided study there is a need to consider the extent to which the knowledge could "be usable in a new set of circumstances, as well as what our warrant is for making any such claims" (Morgan, 2007, p. 72). Therefore, it should be stated that the sampling procedure of the present study aimed to generate the knowledge in the research context, which would allow the hypothesis to be supported or rejected and could be useful in the identified field of practice and context of research.

3.4.3 Questionnaire and interview procedures

Having described the process of gaining access to research participants, including my research positionality as well as the process of sampling and the participants of the study, the present part of the section on the data collection process aims to describe the process of questionnaire administration and interviewing the research participants. Although these data collection processes were conducted in each school that was visited, and considered as simultaneously conducted processes, the present section will describe them separately.

Questionnaire

The first step in the process of questionnaire administration was related to the negotiation of the best time for the researcher to visit the school. The discussions with school representatives resulted in agreement to assemble teachers for a research-sharing session during the longest break, that lasted 20 minutes. During the allocated time for the research-sharing session, each conversation with potential research participants started with a personal introduction and a description of the research project.

During this process I stressed the importance to me of hearing teachers' voice and the anonymous nature of the responses. Moreover, directed by ethical research guidance (BERA, 2011) and in line with the information/consent form provided (Appendix 3) teachers were informed of their freedom to withdraw at any time during the survey, that overall results at the group level gained during the study may be published, but individual participants would not be identified, and their personal results would remain confidential. Moreover, respondents were encouraged to contact me, or my supervisor should they have any questions or require further information, and our personal emails were provided.

Along with distribution of the consent forms, the research-sharing session also involved the distribution of the questionnaire. Both consent forms and questionnaires were printed in advance in both Kazakh and Russian, and the respondents chose their preferred language, as in the context of this research, some research participants preferred to answer in Kazakh and others in Russian, and the reasons for the use of both languages in Kazakhstan have been extensively discussed elsewhere (Goodman & Karabassova, 2018; Mukhtarova, 2013). When the potential respondents were holding their questionnaires,

we reviewed each questionnaire item (Appendix 1) and discussed the concepts of virtual professional networks and communities.

I took into consideration the limitations of the process of administering a paper-based questionnaire, particularly the possibility that respondents could feel uncomfortable about completing the questionnaire in the presence of the researcher and might have wanted to have more time to think (Cohen et al., 2015). When inviting teachers to participate in the research, I explained that filling the questionnaire in was expected to be done at some point during the working day while I was present at school, as every school allowed me to stay in the staff room and in some schools even provided the office of school psychologist for me to use. In this way, I ensured that should teachers have any questions, they could easily find me.

Interviews

As I employed a mixed-method convergent parallel design, the quantitative and qualitative data collection procedures were performed concurrently. Therefore, once there was an opportunity to conduct the survey with teachers in one school by means of a paper-based questionnaire, semi-structured face-to-face interviews with volunteers from among the teachers were conducted as well. Therefore, while administering the survey, teachers were asked to participate in face-to-face interviews. As a result, at least one teacher in each school volunteered to participate in the research.

All the interviews were conducted either in Kazakh or in Russian, depending on the interview participants' preferences. My knowledge of Kazakh and Russian languages provided me with an opportunity to collect the data without an interpreter and in this way to overcome the issue of communication. In this regard, Cohen, Manion and Morrison (2018) identify that threats to the validity in cross-cultural research include the problems associated with the researcher's inability to speak the language (s) of the participants.

Each interview was conducted in a free and empty classroom and lasted on average 20 minutes. Prior to starting the interviewing process, the participants signed the consent form and were asked if they were to be recorded, with the promise that all recordings and transcriptions would be treated as confidential data and, in the case of publication, their

names would be coded to protect the anonymity of themselves individuals and the schools.

The interviews were recorded using Dictaphone and transcribed by the researcher in Kazakh or Russian during and after the fieldwork period. It is important to state that this was a useful learning point in the process of conducting the research. It was helpful not only because, as argued by Brinkmann and Kvale (2015), that transcribing personal interviews provides researchers with an opportunity to learn their own interviewing style, and consequently to modify the questions and structure the following interviews along with interactional aspects, but also because transcribing during the data collection process, provided space for further questions to arise and the opportunity to reach saturation point in relation to emerging findings. For example, emerging patterns within the first interviews relating to teachers' membership in virtual professional communities modified the structure of the following interviews in relation to this question. In particular, I started using a sheet of paper in order to make it easier for research participants to keep track of discussed virtual professional communities.

This section (3.4) is devoted to the process of data collection, and in it I have explained how I collected data in the present study in accordance with practical and ethical (BERA, 2011) considerations. In summary, I collected and transcribed the data in both Kazakh and Russian over a six-month period commencing in November 2017 and finishing in April 2018, with the help of 440 questionnaires and 41 interviews with participants recruited by means of volunteer-convenience sampling in 29 schools. The schools were sampled by means of cluster-probability and volunteer-convenience sampling procedures in one of the regions of the northern part of Kazakhstan. Regions in this cluster (North) were leading in terms of the number of small schools (OECD, 2015) and these school were identified in Chapter 1 as those in which where teachers would potentially most benefit from the process of building social capital within a social media space.

3.5 Data analysis

Reflecting the mixed-methods parallel research design of the present study, the analysis of the collected data was performed using both qualitative and qualitative approaches,

which are described in this section. In particular, this section seeks to illustrate how the analysis process was aiming to achieve complementarity and develop measurement scales in the conceptual framework, as complementarity and development were identified as the two main factors that informed the research design (section 3.2). To this end, Morgan (2019, p. 6) argues that complementarity is one of the outcomes of "the comparison of results from qualitative and quantitative studies that attempt to answer the same research question(s)", which allows one to move away from the term of 'triangulation' in mixed-methods research.

Table 3.7: Overview of the research questions and data analysis

Research Questions	Interview	Questionnaire
RQ 1: What is the nature of virtual professional communities of teachers?	Thematic analysis Social Network Analysis (SNA) - Affiliations	Descriptive statistical analysis Inferential statistical analysis (Binary logistic regression)
RQ2: What is the nature of knowledge sharing and receiving in virtual professional communities?	Thematic analysis	Descriptive statistical analysis
RQ3: To what extent and in what ways is the need for professional connectedness and knowledge sharing self-efficacy associated with knowledge sharing and receiving in virtual professional communities?	Thematic analysis	Descriptive statistical analysis Inferential statistical analysis (Structural equational modelling)

Therefore, with the aim of providing a summary and visual overview of the analysis process, and seeking to achieve complementarity and develop measurement scales, the table 3.7 lists the types of the analysis with respect to each research question and data collection methods in the present study. Following the overview of the data analysis processes, which were interconnected, I will describe each data analysis process in accordance with the data collection methods, specifically, interviews (section 3.5.1) and questionnaires (section 3.5.2) and finally describe the measures used in this study (section 3.5.3).

3.5.1 Interview analysis

As has been mentioned before (section 3.4.3), the initial part of the interview analysis started during the process of data collection during when I started transcribing the interviews; however, the analysis of all the interviews started when I transcribed all of them in word format after the fieldwork. It should be noted that the decision to transcribe personally was not only related not only to what would benefit of the interview and analysis procedures, but also to the ethical consideration, particularly the need to ensure confidentiality. The transcripts were imported into NVivo qualitative data analysis software (NVivo) (version12), with transcripts being uploaded as separate documents and coded in accordance with the place of work (table 3.8).

Table 3.8: Codes of the interview participants

N	Code	Place of work
1	D1_town_1T	Town school 1
2	D1_town_2T	Town school 1
3	D1_town_3T	Town school 2
4	D1_village1_1T	village1
5	D1_village2_1T	Village2
6	D1_village3_1T	Village3
7	D1_village3_2T	Village3
8	D1_village3_3T	Village3
9	D1_village3_4T	Village3
10	D1_village4_1T	Village4
11	D1_village4_2T	Village4
12	D1_village5_1T	Village5
13	D1_village6_1T	Village6
14	D1_village6_2T	Village6
15	D1_village7_1T	Village7
16	D1_village8_1T	Village8
17	D1_town_4T	Town school 1
18	D1_town_5T	Town school 1
19	D1_village9_1T	Village9
20	D1_village10_1T	Village10
21	D1_village11_1T	Village11
22	D1_village12_1T	Village12
23	D1_village12_2T	Village12
24	D1_village13_1T	Village13
25	D2_town_1T	Town school 1
26	D2_village1_1T	village1
27	D2_village2_1T	Village2
28	D2_village3_1T	Village3
29	D2_village4_1T	Village4
30	D2_village5_1T	Village5
31	D2_village6_1T	Village6
32	D2_village7_1T	Village7
33	D2_village8_1T	Village8
34	D2_village9_1T	Village9
35	D2_village10_1T	Village10
36	D2_village11_1T	Village11
37	City_1T	City_school_1
38	City_2T	City_school_2
39	City_3T	City_school_3
40	City_4T	City_school_4
41	City_5T	City_school_5

It should be noted that all transcripts of the interviews were in the original languages that were used during the interviews, and the analysis of transcribed interviews was conducted in the corresponding languages (Kazakh and Russian) with only codes, themes and selected quotes from the participants being translated into English language. On the one hand, one of the reasons for such a decision was related to the pragmatic approach to the research because to translate all the interviews, was considered as a time-consuming endeavour. On the other hand,

> the early 'domestication' of research into written English may mean that the ties between language and identity/culture are cut to the disadvantage of non-English speakers. The baseline becomes mainstream English as soon as possible. This is not to deny that insights may come from the cut-off itself, but it is merely raising the possibility of an all too early termination of dialogue (Temple & Young, 2004, p. 174).

Therefore, in order not to lose the meaning of the original languages and to analyse the data in the most efficient way possible, the transcripts of face-to-face interviews with teachers were imported into NVivo in the original languages.

Thematic analysis was identified as a method for qualitative data analysis in this study: it is "a method for identifying, analyzing and reporting patterns (themes) within data" (Braun & Clarke, 2006, p.79). Thematic analysis is a "flexible approach that can be used across a range of epistemologies and research questions" (Braun & Clarke, 2006, p.97) and therefore is in line with the philosophical approach that shaped the process used to conduct this research (pragmatism). Moreover, thematic analysis was selected as a useful method to learn during the study (PhD programme) as it provides the researcher with fundamental skills necessary to perform other methods of qualitative analysis (Braun & Clarke, 2006).

Thematic analysis was therefore conducted in accordance with the six phases presented by Braun and Clarke (2006, p.87), namely, 1) becoming familiar with the data; 2) generating initial codes; 3) searching for themes; 4) reviewing themes; 5) defining and naming themes; 6) producing the report. Immersion in the collected data as part of the thematic analysis process started with the process of transcribing all the interviews. Coding and collating codes into the themes consisted of an iterative analytical process that employed both inductive (grounded in the data) and theoretically driven approaches. Here, it should be mentioned that during the process of the thematic analysis of interview transcripts, I worked with transcripts in the original languages (Kazakh and Russian), the reasons for which I have mentioned above. In this way, I was reading transcripts in the

original language, but created codes and themes in English and translated only the quotes required for presentation in the findings chapter.

With the aim of filtering the data and preparing for the consequent analysis, the first cycle of the coding process employed structural coding. “Structural coding applies a content-based or conceptual phrase representing a topic of inquiry to a segment of data that related to a specific research question used to frame the interview” (Saldaña, 2016, p.98). Saldaña (2016) explains that as a question-based coding, structural coding is more suitable for interview transcripts. Therefore, with regard to the research questions in this study, the first cycle of coding allocated the data within the Nvivo into five segments (figure 3.6).

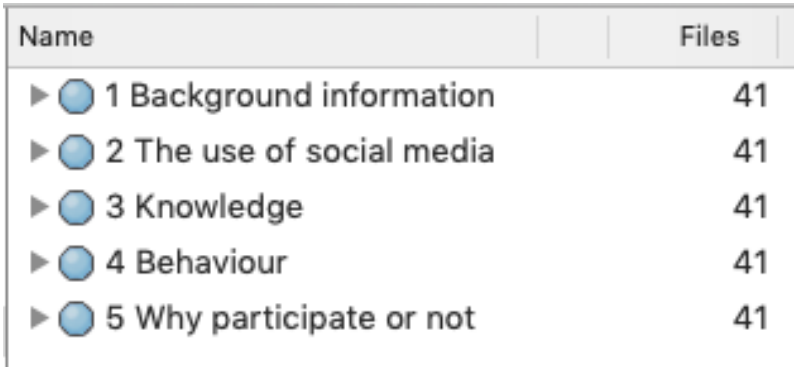


Figure 3.6: Structural codes of the first cycle coding

With the aim of grouping the summaries within the identified segments into a smaller number of categories (themes), the second cycle of coding in the present study employed ‘pattern codding’. “Pattern codes are explanatory or inferential codes, ones that identify an emergent theme, configuration or explanation” (Miles, Huberman & Saldaña, 2014, p.86). Therefore, in accordance with the segments identified during first cycle of coding and identified research questions, the analysis of the present study resulted in the identification of themes. A detailed description of the themes as well as examples of sub-codes within each theme will be presented in Chapter 4, where the findings of this research will be presented.

3.5.2 Questionnaire analysis

The initial step in the analysis of the questionnaire was the process of coding questionnaire responses using the Statistical Package for the Social Sciences (SPSS) software version 25, followed by the processes of screening and cleaning of the data, in particular finding and correcting errors. The recruitment process of the research participants resulted in a sample of 444 completed questionnaires, and four out of this sample were excluded from the analysis as only the first part the questionnaire had been completed. At the same time, the cleaning procedure revealed missing values in the observed variables of the latent variables, the treatment of which will be discussed in the presentation of the results of quantitative analysis (Chapter 4).

In summary, all research questions were addressed with the help of descriptive analysis of the questionnaire responses, while the first and the third questions were also addressed with the help of inferential statistics. In particular, part of the analysis of the findings relating to the first research question was performed by means of binary logistic regression when exploring whether teaching experience and the age of teachers were associated with their participation in virtual professional communities. Meanwhile, the analysis of the findings with respect to the third research question involved Structural equation modelling (SEM).

Part of the third research question in this study was a confirmatory in nature, having with several variables as the question sought to examine the extent to which the need for professional connectedness and knowledge sharing self-efficacy are associated with knowledge sharing and receiving in virtual professional communities of teachers. With regard to this, SEM is

> a statistical methodology that takes confirmatory (i.e., hypothesis testing) approach to the analysis of a structural theory bearing on some phenomenon. […] The hypothesised model can then be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data (Byrne, 2016, p.3).

While SPSS (version 25) was used for the analysis of all research questions, SEM was performed using Analysis of Moment Structures (AMOS) version 25. The results of analysis are presented in the Chapter 4 which reports the findings of this research. Although the results of the descriptive and inferential analysis, including descriptions of the process of preparing the questionnaire data for SEM, are presented together in the subsequent chapter, this section presents the latent variables of SEM, and in this way explain the process the developing measures.

3.5.3 Measures

This section aims to describe the development of measures in conceptual framework (section 2.4). The following measures such as knowledge sharing and receiving, knowledge sharing self-efficacy and the need for professional connectedness will be described in detail in the following sections. However, while some types of measurement validity are described in this section, convergent and discriminant validity of the measures used as well as internal reliability are presented in Chapter 4, where the results of SEM are presented.

Knowledge sharing and receiving

Originally the dependent variables (knowledge sharing and receiving) were measured using 19 items on a three-point response scale, that is, never, seldom and often, which were modifications and extensions of those used by Tseng and Kuo (2014) in accordance with the research questions and design of the present study. To this end, ten items from the original study were modified and extended to comprise 19 items based on the following changes.

First of all, in order to have less text to read, it was decided to use one overarching statement '*During the last six months*' rather than repeating it in every question. Secondly, the name of the concrete community was deleted from the items and two items related to the behaviour of other people were also deleted. Finally, three items were modified and extended to consist of 14 items in order to avoid the words *'knowledge'* and *'skills'* so that respondents could easily answer the questions provided. Therefore, the item *'During the past six months I often contribute my teaching experience, knowledge or skills'* was modified and extended to comprise the following seven items: *'initiated*

discussions in relation to interesting for me topics'; 'shared news on educational policy'; 'shared links of websites that may be interesting for teachers'; 'shared my successful teaching practice'; 'shared my failures and problems'; 'shared ideas for teaching practice'; 'shared my opinion on educational policy'. According to the same logic, two items '*I read other members' articles posted in…'* and '*I read other members' stories'* were modified to consist of the following three items: *'read other members' posts, that included ideas, opinion, experience'; 'read other members' posts, that included news'; 'read other members' posts that included links to other websites'.*

Moreover, reflecting the existing debate regarding the nature of knowledge sharing presented in Chapter 2 (Ridings et al. , 2002; Wang & Noe, 2010; John, 2012), this study adopted the John's (2012) explanation of sharing and therefore refers to activities in which teachers give or request knowledge in response or on their own initiative, implying the active participation within their virtual professional communities. In order to be able to reflect this conceptualisation of knowledge sharing, I added four items related to the request for information, namely: *'asked for other members' ideas, opinions, experience*'; *'asked for news on educational policy'; 'asked for links to websites necessary for teaching'*; *'asked for group members' resources'.*

Meanwhile, simultaneous analysis of interview transcripts (presented in Chapter 4) suggested the deletion of the items from the measurement scale for a further analysis in order to reflect the findings of the qualitative data. The results of inductive thematic and clustering analysis of interview data were classified into dialogic and disseminative, with dialogic knowledge sharing referring to asking and responding to the discussions or questions, while disseminative knowledge sharing involved circulation of knowledge. Although some teachers reported that they were the agents of disseminative knowledge sharing, the majority of teachers described a dialogic nature of knowledge sharing within virtual professional communities of teachers and therefore reported that knowledge exchange was mostly happening upon the request.

As a consequence, 13 items were deleted from the measurement scale of this research as nine items related to disseminative knowledge sharing and four items did not represent typical sharing patterns of the interview participants (table 3.9). In this way, three items

of the construct relating to knowledge sharing and three items of the construct associated with knowledge receiving were consistent with the conceptualization of the research, according to which knowledge sharing was conceptualized in line with John's (2012) explanation of sharing. Therefore, taking into consideration the qualitative and quantitative analysis of the data collected in this study, knowledge sharing referred to the activities in which teachers asked questions of other members of virtual professional communities or responded to them. While knowledge receiving referred to the to the activities in which teachers read other members' posts. Both dependent variables were measured on a three-point response scale, namely, never, seldom and often.

Table 3.9: Dependent variables: knowledge sharing and receiving

1	read other members' posts, that included ideas, opinion, experience
2	read other members' posts, that included news
3	read other members' posts that included links to other websites
4	downloaded teaching resources from the group discussions
5	asked for other members' ideas, opinions, experience
6	asked for news on educational policy
7	asked for links to websites necessary for teaching
8	asked for group members' resources
9	uploaded my teaching resources in my groups
10	initiated discussions in relation to topics interesting to me
11	shared news on educational policy
12	shared links to websites that may be interesting for teachers
13	shared my emotions
14	shared my successful teaching practice
15	shared my failures and problems
16	shared ideas for teaching practice
17	shared my opinion on educational policy
18	responded to the topics discussed
19	expressed my concern and encouragement to other members

	Knowledge receiving
1	read other members' posts, that included ideas, opinions, experience
2	read other members' posts, that included news
3	read other members' posts that included links to other websites

	Knowledge sharing
1	asked for other members' ideas, opinions, experience
2	asked for group members' resources
3	responded to the topics discussed

Knowledge sharing self-efficacy

Originally the independent variable, knowledge sharing self-efficacy, was measured using 11 items modified and extended from the scale developed by Tseng and Kuo (2014). Eight items from the original study were modified and extended into 11 items based on the following changes. Firstly, the ten-point percentage scale, ranging from 10 per cent to 100 per cent, was modified into a five-point scale ranging from 1 to 5 levels of

confidence as I thought it would be easier for the respondents to answer if the scale were more restricted.

Secondly, the word 'confidence' used in every item of the original scale was used in an overarching question that referred to all items. The name of the actual community was deleted from the items. One item relating to confidence about sharing emotions was divided into two items so that there was a separate item for positive emotions and another for negative emotions, because it was considered that respondents would find it difficult to answer this question if they were confident about sharing positive emotions but hesitant about sharing negative emotions. One item related to confidence of sharing an opinion that could be offensive was deleted. One new item was developed, which was asking the level of confidence of sharing any opinion, which was followed by existing item related to an opinion, which is different from others, that itself may result in offence or may not. Finally, one item *'I have confidence in engaging in knowledge sharing activities'* was divided into two items in order to unpack the word 'knowledge' linking it to activities that were not mentioned in existing items, hence, one item was *'Initiating discussions in relation to certain topics that interest you'* and another *'Sharing news and links to other websites'*.

Table 3.10: Independent variable: knowledge sharing self-efficacy

1	Sharing teaching resources
2	Sharing an opinion
3	Sharing an opinion even if it is different from others
4	Sharing my teaching experience
5	Sharing my ideas about teaching
6	Sharing my positive emotions
7	Sharing my negative emotions
8	Sharing my success
9	Sharing my failures
10	Initiating discussions in relation to certain, topics of interest to you
11	Sharing news and links to other websites

⇨

1	Sharing teaching resources
2	Sharing an opinion
3	Sharing an opinion even if it is different from others
4	Sharing my teaching experience
5	Sharing my ideas about teaching

However, as a result of the qualitative analysis of interview transcripts, almost half of the items were deleted from the measurement scale for further analysis in order to reflect the identified dependent variable, developed with the help of thematic analysis (table 3.10). Therefore, in the final analysis, knowledge sharing self-efficacy was measured using five items on a five-point scale ranging from 1 to 5 levels of confidence (1 = not at all

confident, 5 = extremely confident). In particular, teachers were asked to rate their level of confidence about sharing within their virtual professional communities teaching resources, an opinion, an opinion even if it is different, teaching experience, and ideas for teaching

The need for professional connectedness

To measure the need for professional connectedness in the quantitative part of the research, a scale was developed based on the results of previous qualitative studies (Cho, 2016; Hur & Brush, 2009; Wesely, 2013). Hur and Brush (2009) and also Wesely (2013) suggest that one of the reasons for the use of social media is the feeling of professional isolation due to various factors, such as being the only teacher of a specific subject or the lack of time to talk. The study conducted by Cho (2016) suggests that interaction with colleagues by means of Twitter increases school administrators' sense of belonging as participation reduces their sense of isolation and fosters a feeling of specialness. Therefore, the need for professional connectedness was measured by three items on a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree' (table 3.11).

Table 3.11: Independent variable: Need for professional connectedness

1	Makes me feel special to be able to connect with teachers from all over the country
2	Gives me a feeling that I am not on my own
3	I feel myself less isolated from other professionals in my country

Validity and reliability of the measures

Validity refers to the ability of "the instrument to measure the attributes of the construct under study", whereas reliability "refers to the ability of an instrument to measure an attribute consistently" (DeVon et al., 2007, p. 155-156). With the aim of assuring the integrity of the findings within in the present study, this section will present the process of ensuring the validity and reliability of the measurement instruments.

Content validity

To manifest content validity the instrument should demonstrate its comprehensiveness and relevance to the aims of the study (DeVon et al., 2007). In this regard, with the aim of ensuring content validity, three measurement constructs were based on an existing instrument used in the study of Tseng & Kuo (2014) and one measurement construct was

developed on the basis of existing qualitative studies conducted by Hur and Brush (2009), Wesely (2013), and Cho (2016). Moreover, one of the reasons for the need for a mixed-method approach in this study was to use findings from the analysis of the interviews in order to inform the analysis of quantitative data so that the measurement instrument used in the quantitative analysis would be relevant to research context.

Cross-cultural validity

Cohen et al. (2018) discuss a large number of areas in which validity could be threatened in cross-cultural research. Therefore, since this study used research and measurement instruments from contexts that were different from that of Kazakhstan, the task was also to ensure cross-cultural validity. Reviewing results in cross-cultural research, Banville, Desrosiers and Genet-Volet (2000) argue that constructs existing in one culture are not automatically present or important in another and they suggest involving a team of bilingual experts in the research field when preparing measurement instruments.

Since measurement instruments needed to be ready for use in both Kazakh and Russian, the process of ensuring cross-cultural validity required the involvement of trilingual experts, who would be able to consider all necessary features. In particular, as pointed out by Pen˜a (2007), in order to reduce validity threats in cross-cultural research, several aspects of equivalence, such as linguistic, functional, cultural and metric ones needed to be taking into consideration. In this regard, first of all, it should be stated that my personal knowledge of English, Kazakh and Russian language helped to ensure cross-cultural validity within the present study. Secondly, to ensure linguistic, functional and cultural equivalence the translation process involved professional translators, the first of whom was an expert in translation between English and Russian, and the second, between Kazakh and Russian with a knowledge of English. Therefore, to ensure linguistic and functional equivalence, in other words, to guarantee that "words and linguistic meaning used in the instruments and instructions are the same for both versions" and to make sure "equivalence in meaning and salience with respect to the respondent (Pen˜a, 2007, p.1256-1258), the translation was done by professional translators, who at the same time were native language speakers.

Finally, cultural equivalence, which is related to the possible differences in the way that people from different cultural and linguistic groups could view or interpret items (Pen˜a, 2007), was considered during the process of adapting the existing scales. To this end, when adapting the scale for the present study, I tried to avoid words that could culturally or personally be differently determined. Hence, as described in the previous sections, items with such words as: 'knowledge', 'skills' or 'article', 'stories' were modified.

Face validity

Face validity denotes that the measurement instrument "looks, on the face of it, as if it measures the construct of interest", and although this form of validity does not signify that the scale measures the research construct, it allows us to understand how the research participants could comprehend and respond (DeVon et al., 2007, p. 157). In this regard, the first step towards ensuring face validity was undertaken while modifying the existing scale, as described in the previous sections. The changes were mostly related to modification of the scale range and creating overarching questions so that respondents could spend less time in thinking which answer would better describe their response and in reading the instructions and questionnaire items. The second step in ensuring face validity was the request of two professional translators mentioned previously to evaluate the face validity of the survey, who provided positive feedback on overall readability, clarity of the language, syntax and organization as well as feasibility.

Convergent and discriminant validity

Convergent and discriminant validity are both aspects of construct validity. Convergent validity is indicated "when factors that should be related to each other are found, by indicators, actually to be related", whereas, discriminant validity "requires two or more unrelated items, attributes, elements or factors to be shown (e.g. by measurement) to be unrelated to, or different from, each other, i.e. difference is found where it should be found, even if those items at first seem to be similar" (Cohen et al., 2018, p.257-258).

To ensure the convergent and discriminant validity of the measures used in this study, firstly, all constructs were considered with respect to both qualitative and quantitative sets of data. Secondly, convergent and discriminant validity of the present measures as well as internal reliability were checked in relation to the factor analysis process, which is

discussed in Chapter 4, when the research findings are reported. Along with a description of the procedures used to ensure the validity and reliability of the measures, I should acknowledge that the parallel mixed-method research design of the present study could have been a limiting factor when it came to obtaining high internal reliability and convergent validity of both adapted and developed measures.

Overall, the measurements used in the present study provided an opportunity to obtain a valuable insight into informal learning within virtual professional communities, in particular, to collect self-reported data on knowledge sharing and receiving, the need for professional connectedness and knowledge sharing self-efficacy. However, since the questionnaire respondents were asked to evaluate themselves on average across all their virtual professional communities, one could consider this to be a limitation, particularly in relation to self-efficacy, as "to achieve explanatory and predictive power, measures of personal efficacy must be tailored to domains of functioning [,..] the types of capabilities it calls upon, and the range of situations in which these capabilities might be applied" (Bandura (1997, p.42). To this end, the results of thematic analysis of the interviews in the present study suggested the dependence of the results of personal evaluation of knowledge sharing self-efficacy from the membership in virtual professional community.

In this regard, there is a need to note that the decision to measure the latent variables in the present study in the way that they were measured was firstly informed by the explorative nature of the present research, in which, on the one hand, according to the data collection method (paper-based questionnaire), it was impossible to ask participants to evaluate personal practice within every available virtual professional community; on the other hand, the quantitative data collection and analysis were used in order to open up a space for exploratory findings. Secondly, the decision in relation to generalised self-efficacy was informed by the following considerations:

> self-efficacy may be generalized to tasks within a given domain following a successful performance on related tasks (Bandura, 1977). As one's level of self-efficacy increases as a result of successful experiences, according to the theory, self-efficacy may transfer to dissimilar domains (Choi, 2004, p. 150),

> individuals with histories of varied and numerous experiences of success may be expected to have positive self-efficacy expectancies in a greater variety of situations than individuals with experiences of limited success and of failure (Sherer et al.,1982, p.664).

In summary, the present chapter presented the methodological rationale for the research. The chapter discussed philosophical, practical and ethical aspects that I considered when planning and implementing the research as well as acknowledging potential limitations of the study. It has provided an overview of the research design, followed by the data collection methods, processes and analysis in accordance with the research questions; the latter also guides the structure of the next chapter, which is devoted to the findings of the study.

CHAPTER 4. FINDINGS

Chapter 4 presents the findings identified within the framework of the research. The aim is to develop some understanding in relation to the nature of informal learning in virtual professional communities of teachers in Kazakhstan. This chapter presents the findings under the headings of the three research questions, and then with the summary of the overall findings. It will be divided into four sections:

4.1 RQ 1: What is the nature of virtual professional communities of teachers?

4.2 RQ 2: What is the nature of knowledge sharing and receiving in virtual professional communities?

4.3 RQ 3: To what extent and in what ways is the need for professional connectedness and knowledge sharing self-efficacy associated with knowledge sharing and receiving in virtual professional communities?

4.4. Summary of the overall findings

4.1. RQ 1: What is the nature of virtual professional communities?

This section presents the findings to answer the first research question and are arranged in two sub-questions that guided the exploration of the nature of virtual professional networks. How popular is the use of social media for professional communities? What virtual professional communities are teachers members of? The key findings are that:

- 89% of teachers are members of the virtual professional communities
- Membership of a social media group is associated with increasing professional knowledge.
- Most links are established during face-to-face professional learning courses.
- Social media enables connections at all levels horizontally between teachers vertically to district regional and country level connections.

The evidence for these claims is set out below.

4.1.1 Participation in virtual professional communities

The data presented here come from the analysis of the questionnaire, particularly in response to the question about whether teachers were members of virtual professional communities. The analysis of questionnaire responses shows that 89.3 per cent of teachers, who participated in the present study, were members of virtual professional communities (table 4.1).

Table 4.1: Participation in virtual professional communities

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Yes	391	88.9	89.3	89.3
	No	47	10.7	10.7	100.0
	Total	438	99.5	100.0	
Missing		2	.5		
Total		440	100.0		

A further examination of the 10.7 per cent of the respondents who reported that they were not members of virtual professional communities (figures 4.1) shows that more than half of these respondents had 21 or more years of teaching experience. In other words, there may be a relationship between years of teaching experience and the membership of virtual professional communities among the respondents of this study.

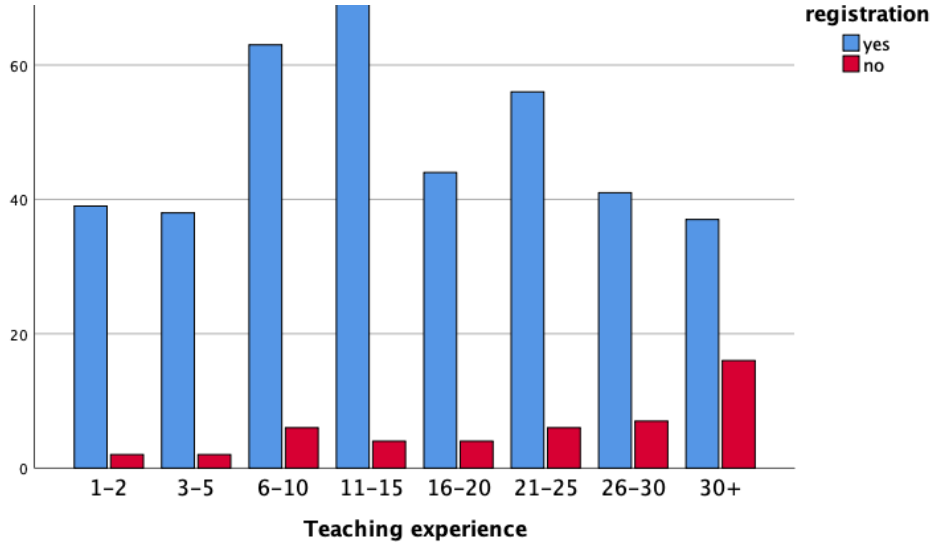


Figure 4.1: Membership of virtual professional communities and teaching experience

However, the length of teaching experience may not necessarily reflect the age of teachers, as teachers may start their teaching career after experience of working in another field. Therefore, with the aim of checking the existence of an association between teachers' membership of virtual professional communities and their age, binary logistic regression and descriptive cross-tabulation analysis were performed. The descriptive analysis of teachers' membership of virtual professional communities across the age range of teachers (figures 4.2 and 4.3) demonstrates that a high proportion of those who were over 50 years old were not members of virtual professional communities.

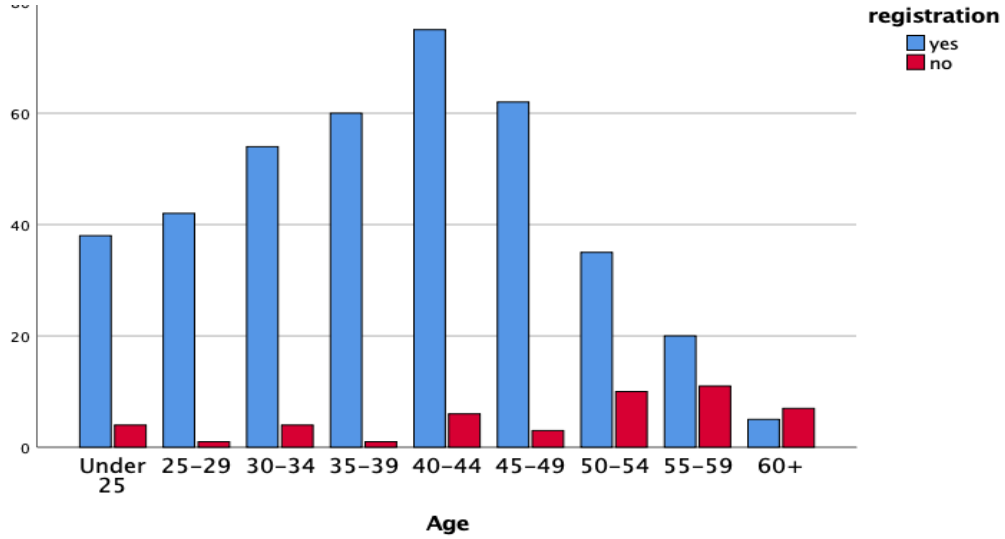


Figure 4.2: Membership of virtual professional communities and age

Using binary logistic regression analysis to support descriptive analysis (figure 4.2) the model was able to predict participation and the overall correct percentage prediction rate was 89.3 per cent. The model addressing teachers' age as a predictor of teachers' use of social media for professional networking was significantly better than the constant only model [Chi-Square=31.091, df=1 and p=0.001 (<0.05)]. Examining the goodness of fit of the model, it could be seen from the Nagelkerke R Square, that 14 per cent of the variation in teachers' membership of virtual professional communities was accounted for by *age*. The Hosmer and Lemeshow test also confirmed that the model fitted the data [chi-square=25.686, df=6 and p=0.000 (<0.05)]. Therefore, although the proportion of those who were not members of virtual professional communities was only 10.7 per cent, the binary logistic regression analysis that was performed suggested that the membership rate of virtual professional communities decreased with the increase in teachers' age [Wald=26.188, p=0.000 (<0.05)] as the odds ratio was 1.551 (95% CI: 1.311 – 1.835) (table 4.2).

Table 4.2: The results of binary logistic regression

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	31.091	1	.000
	Block	31.091	1	.000
	Model	31.091	1	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	267.489[a]	.069	.139

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	25.686	6	.000

Classification Table[a]

			Predicted		
			VPN registration		
	Observed		yes	no	Percentage Correct
Step 1	VPN registration	yes	391	0	100.0
		no	47	0	.0
	Overall Percentage				89.3

a. The cut value is .500

Variables in the Equation

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Age	.439	.086	26.188	1	.000	1.551	1.311	1.835
	Constant	-4.458	.537	68.917	1	.000	.012		

a. Variable(s) entered on step 1: Age.

Overall there is suggestion that membership of virtual professional communities is a widespread phenomenon among respondents, as the majority of them (89.3 %) were members of virtual professional communities. The next two sections present the findings relating to identified types of virtual professional communities and most commonly used platforms.

Both questionnaire and interview respondents were asked to specify which platform is most frequently used within their virtual professional communities. In particular, they were asked to list the three most commonly used platforms to communicate with other teachers on professional issues. Therefore, although respondents could use various platforms for personal and professional purposes, they were asked to report only those that were most often used for participating within virtual professional communities, in other words, to mention only those platforms that were most often used to communicate with other professionals.

The result of the analysis shows that, first of all, teachers were using multiple platforms, such as WhatsApp, Facebook, Vkontakte, Telegram and Mail.ru. Secondly, WhatsApp seemed to be ubiquitous (figures 4.3 and 4.4). It should be noted that the number of respondents who were using Facebook, Vkontakte, Telegram and Mail.ru for professional purposes, including virtual professional communities, could be the higher, because the proportion reflects the answer to the question that was related to the most commonly used social media platform within virtual professional communities.

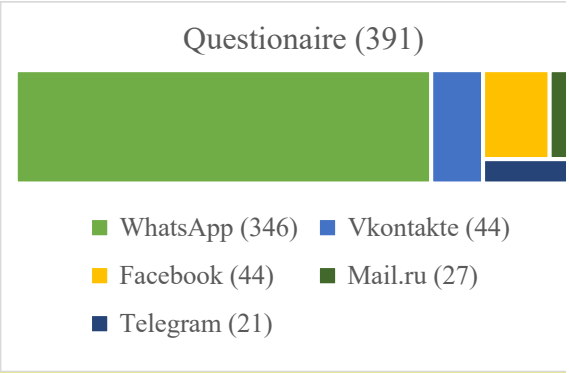


Figure 4.3: Platform use from questionnaire responses

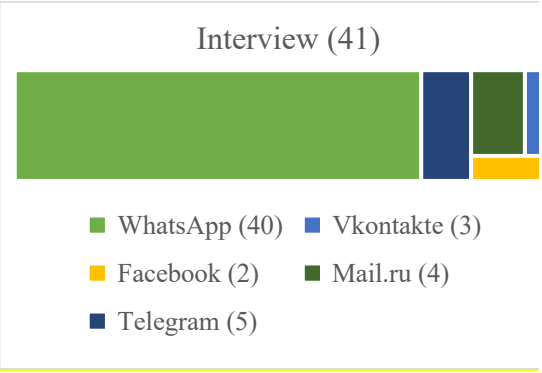


Figure 4.4: Platform use from interview responses

In comparison with other social media platforms, at the time of data collection, WhatsApp Messenger was the most commonly used within virtual professional communities of teachers. Overall, although teachers could use various platforms for personal and professional use, at the time that I conducted data collection for this study, virtual professional communities in WhatsApp platform were the most popular among the respondents, suggesting that WhatsApp was the most commonly used platform.

4.1.2 Membership

In order to explore potential patterns of teachers' participation in virtual professional networks, interview participants were asked to describe their membership of virtual professional communities, as "membership of an organization or participation in an event is a source of social ties" and "networks of affiliations tells us a lot about society" (De Nooy, Mrvar & Batagelj, 2011, p.116).

As a result of affiliation network analysis, the following two patterns were identified: firstly, it seems that teachers were actively using social media in order to stay in touch with other teachers they had met during in-service teacher training courses or seminars. In addition, the thematic analysis suggests that teachers were using social media to communicate with colleagues at the same schools, in the same districts and regions or across the country. In order to differentiate types of virtual professional community where teachers were united by attendance at a common in-service teacher training course, these virtual professional communities were identified as virtual professional communities united by common place of work. This has been transformed into an Excel spreadsheet and visualised as shown in figure 4.5. The numbers in the figure represent the number of interview participants and the colours represent the types of virtual professional community of which the respondents were members. The figure shows that the respondents were members of between one and five types of virtual professional community. Visualization of the results of affiliation network analysis demonstrates that teachers' membership of virtual professional communities could be divided into two major types of professional community, namely, 'common place of work' and 'common course or seminar'. 78% of these teachers had established horizontal links with peers who they met on face to face courses. Whilst 40% had also made links with contacts at district, regional and country level.

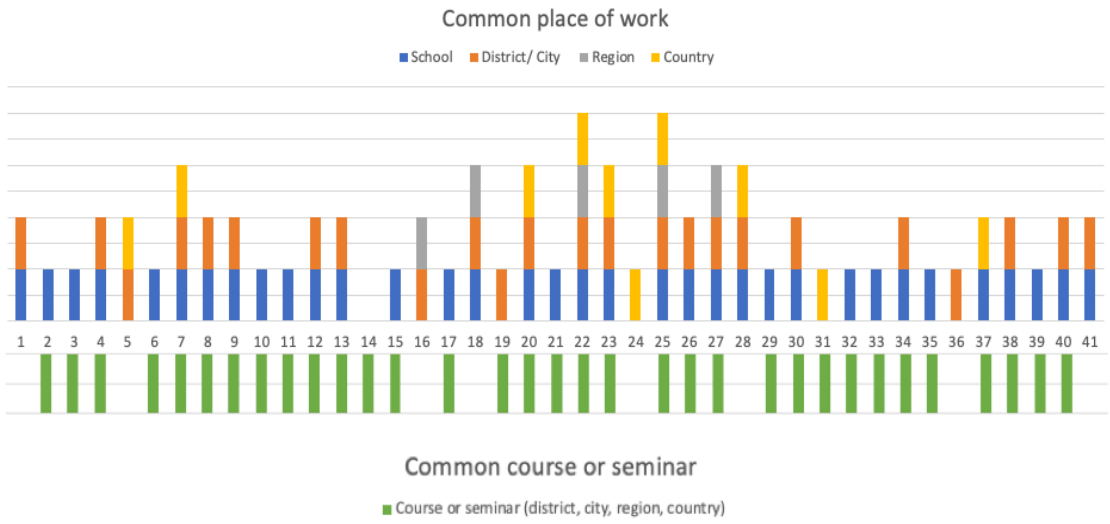


Figure 4.5: Virtual professional community membership of interview participants

Additionally, both types of group may be further differentiated in various ways, since as well as these types, groups were formed on the basis of subject taught, school organizational structure and school processes, which will also be discussed in the following sections. Indeed, it should be noted that the subject taught was the most commonly mentioned connection in descriptions of virtual professional communities. Figure 4.6 displays the self-reported membership of each interview participant as forming disconnected groups, but both types of group were formed by teachers from the same or different districts or regions and sometimes there could even be the same teachers in both types of group: *We have teachers who are members of our district group but they are also at the same time members of this region wide group* (D1_village12_1T).

Therefore, it could be suggested that both types of the group are overlapping and interchangeable nature. This means that groups can be created as a result of teachers being introduced to each other during a course, and then they continue to be connected not only because they were on the same course together, but also because they were working in the same district or the same region. Simultaneously, teachers were often taking part in seminars or training courses, organized for teachers in their districts and region. The interchangeable nature of virtual professional communities of teachers can be visualized in the following way (figure 4.6).

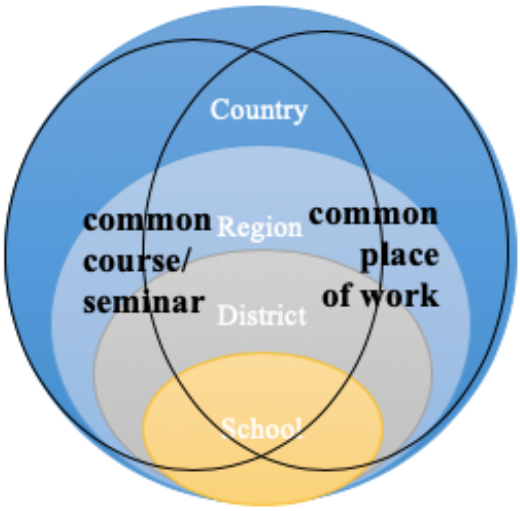


Figure 4.6: Overlapping nature of virtual professional communities of teachers

Overall, illustration of affiliation network analysis (figure 4.5) presenting the responses of teachers from districts (numbers 1-36) and the regional centre (numbers 36-41) suggest that all respondents had virtual professional connections beyond the school as they were members of virtual professional communities, created either as a result of common course attendance or on the basis of common place of work. Although the types of group within virtual professional communities could be overlapping and interchangeable in nature, the following sections will describe them separately.

Common course or seminar

Regrouping the results of thematic analysis into two identified types (common course and common place of work) allowed for a better visual representation. Regrouping showed that the majority of respondents reported membership of virtual professional communities, where all members were united by the same course (figure 4.7). The majority of the interview respondents (78%) mentioned in their interviews that they were members of virtual professional communities, created as a result of common attendance at a course or seminar. The respondents mentioned that these professional communities involved their colleagues from the same or different districts and, or different regions: *For example, in my course group we have geography teachers from different districts* (D1_village12_1T)*; in my groups I have history teachers, who work across the region, or may even be in different regions, whom I met during various courses, forums, seminars* (D2_village4_1T).

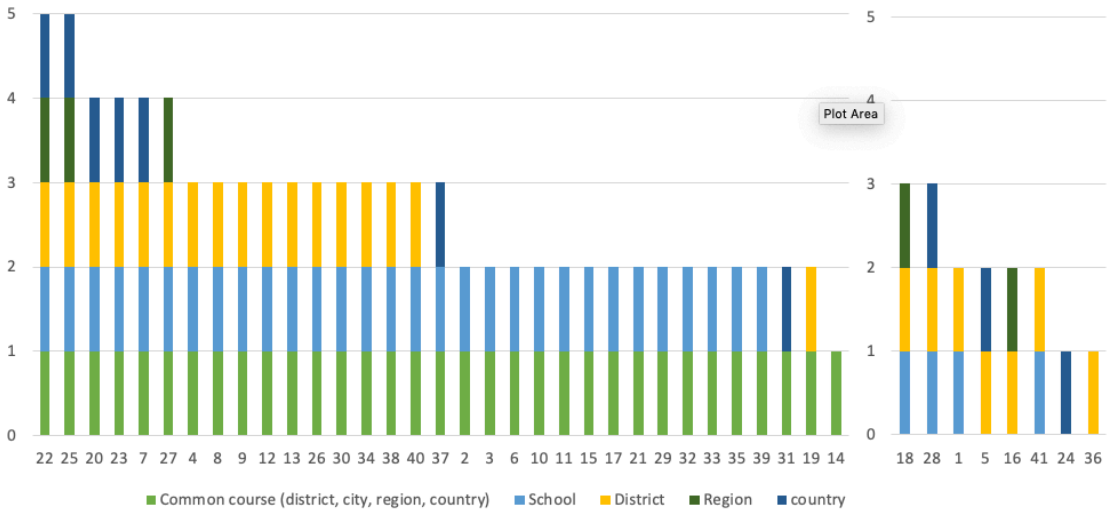


Figure 4.7: Common course virtual professional communities of interview participants

Moreover, all the respondents mentioned which courses had given rise to these groups, initiated either by themselves or their trainers in social media space:

> *I have a trainers' group, as we were trained together as school trainers in 2015, then I have an updated curriculum group, with teachers was on a course with together in 2017, then a multi-level course group, teachers with whom I took this course. I should say that this was our first group.* (D1_town_2T)

> *Two years ago, I had a course on the updated curriculum, so our group, all 34 teachers who were trained together, and we still communicate together with our trainer. Nobody has left the group; in general, I should say that I have a great support from this group.* (D2_village8_1T)

It could be suggested that teachers' responses reflect the latest initiatives introduced within the in-service teacher training system of the country (chapter 1, section 1.1.3). These initiatives include the establishment of the CoE and the accompanying rolling out of the multi-level programme. The multi-level programme reached 52 885 teachers between 2012 – 2015 (Wilson et al., 2016). The main drive of the multi-level programme had been to increase in-service teacher education through the provision of opportunities

for teachers to learn new pedagogical approaches. More recently 176,000 teachers were introduced to an updated curriculum and assessment system, between 2016 -2017 (IAC, 2018).

However, as mentioned previously, the interview participants were recruited on a voluntary basis and therefore their opinions might have been those of particularly proactive teachers. To try to minimize potential bias the questionnaire was analysed further, and the analysis of the descriptive responses showed that 58 per cent of the teachers reported that the groups within the virtual professional networks were created as a result of attending a teacher training course or seminar (figure 4.8).

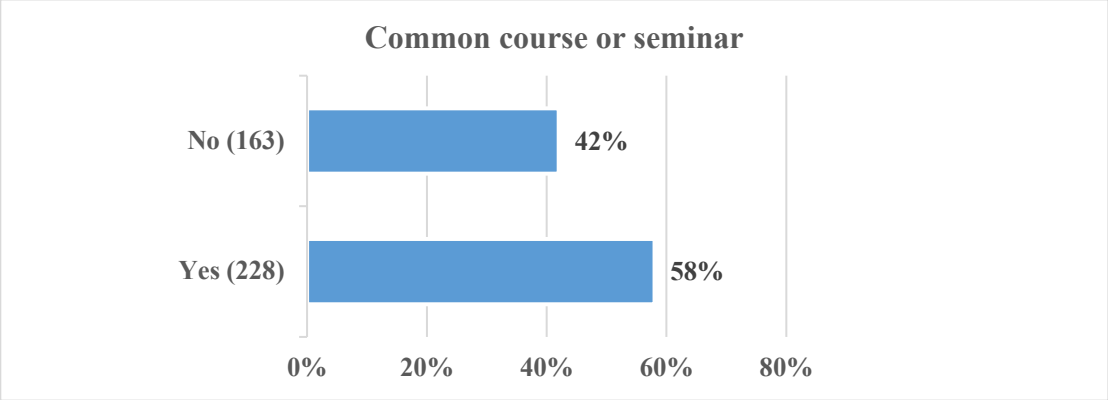


Figure 4.8: Common course virtual professional community membership from questionnaire responses

Overall, it could be reported that social media platforms were being widely used by teachers and trainers to extend links established during courses or seminars. Therefore, it could be inferred that part of the informal role of the virtual professional communities of teachers was related to the courses provided as part of the latest initiatives of the in-service teacher training system of the country, such as the multi-level programme and the updated curriculum. The positive working relationships established between teachers had been maintained beyond the formal face-to-face courses.

Common place of work

Illustration of the thematic analysis of interview transcripts (figure 4.9) demonstrates that almost all respondents were members of virtual professional communities where place of

work was a common factor, and the following sub-sections will present the results of the analysis at each level (school, district, region, country).

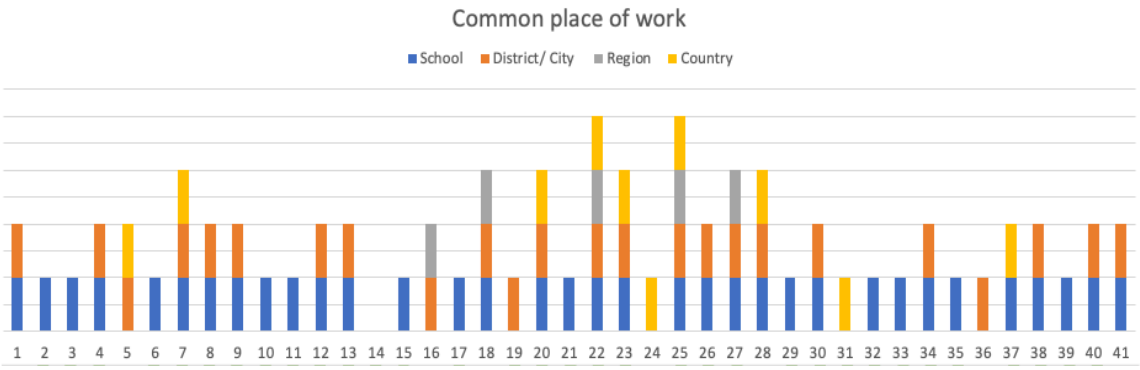


Figure 4.9: Common place of work membership of interview participants

School

The analysis of the interview transcripts suggests that the majority of the respondents (34 out of 41) were members of a school-wide virtual professional community on a social media platform. Further analysis of the data revealed that the seven respondents who did not mention use of social media within the school had varied roles, including one teachers who was a part-time teacher and was visiting a village school from the nearest town, and therefore it could have been the a case that this teacher did not consider herself to be part of the school-wide professional community. As for the rest of the respondents, it could be suggested that, on the one hand, these respondents might not have a school-wide virtual professional community within the social media space. On the other hand, it could be suggested that these respondents did not consider the membership of a school-wide virtual professional community to be part of the virtual professional networks. Due to the fact that these interview participants were among the first to take part, I was not aware of the use of social media within the schools and therefore was unable to clarify this during the process of interviewing these respondents.

While the majority of the teachers reported membership of a whole-school virtual professional community, some of them reported that they were simultaneously a member of smaller groups within the school. It could be clearly seen that membership of school groups within a social media space reflected the organizational structure and processes of the schools. Depending on the size, comprehensive schools in Kazakhstan are required to

have a number of school principal deputies, who are responsible for academic and pastoral education as well as school maintenance (Government of the RK, 2008).

The school principal's deputy responsible for academic work at a school is the one who organizes the work of subject methodological units (SMU), which serve as a means of organizing and improving educational processes within the schools as well as teacher professional development. The head of school SMU is selected (appointed) for one year from among teachers of SMU (Ministry of Education and Science of the Republic of Kazakhstan (MESRK), 2007). The school principal deputy of the for academic work as well as heads of SMU are responsible for the organization of the mentoring process for the beginning teachers within the school (IAC, 2018).

Therefore, when reflecting the organizational structure and processes of the schools, teachers reported their membership of the SMU: *...then I have a school wide-group and our subject [Kazakh language] methodological unit* (D1_town_1T); *my first working group is the one with teachers of English language at our school* (City_2T). Equally, teachers reported membership of the groups created as a result school practices within the schools: *I have one group where there are only homeroom teachers in our school* (City_4T); *for example, I am a mentor for a novice teacher and it is easy for me to communicate* (D1_village2_1T).

District/City

At a district level almost 60 per cent of respondents out of 36 teachers working in rural and district schools reported that they were members of virtual professional communities either in accordance with their subjects (SMU) or school organizational structure (example: deputy heads): *Admin of our group is our head of district methodological unit. She created the group and adds who is necessary* (D1_village10_1T); *at a district level I have a group of school deputy heads on academic affairs* (D2_village2_1T). Similarly, teachers from the city school also reported being members of a common place of work that extended beyond the school level:

> *Then I have a deputy heads' group, responsible for Upbringing Education in school. In this group we have all such deputy heads within the city and 'methodologies' of the city educational department.* (City_2T)

While the above-mentioned quotations might suggest that virtual professional communities could be organised by local educational authorities, other quotations indicate that teachers themselves could exercise leadership:

> *Once during our annual August district teacher conference, we decided to create a group, we thought, 'Why should it be difficult for us?' But thanks to this group, we will have an everyday exchange of experience.* (D2_village11_1T)

Overall, it could be suggested that membership within virtual professional communities at the district level reflected the central school management, with local executive authorities (LEA) at the regional and district levels being responsible for provision of education in schools, including allocation and management of resources as well as organizational and methodological support for schools; these are the responsibility of the Methodological Division within the Education Department of LEA at district and regional levels (MESRK, 2007).

Regional and country level

As for the wider regional level, while only one teacher out of five respondents reported her membership of a large region-wide group, that related to her subject (an English language teachers' group), four out of five respondents mentioned their membership of a regional group because of their job responsibilities as deputy school principals:

> *Oh, I have one more group – deputy principals, because I am currently deputy principal. In this group, we are all deputy heads of schools within our region.* (D1_village12_2T)

….and the group – a regional one where there are school deputy principals responsible for academic affairs. (D1_village12_1T)

My second group is the one with deputy heads of our region. (D1_town_5T)

At country level, ten out of 41 respondents mentioned that they were members of virtual professional communities that involved teachers from different regions of the country. One teacher reported being a member of a group on social media, named 'Kazakhstani teachers', that could be identified as a common place of work. At the same time, in addition to general country-level groups, another teacher reported being a member of a country level group, the members of which were united by job responsibilities within the organizational structure of the school:

I try to read and respond to the group chats of the deputy heads from different districts and regions. Those people are considered to be 'the heart of the school' and they are more informed. (D2_town_1T)

Simultaneously, nine teachers reported being members of the country-level group, where subject could be considered a common factor: *'here we have teachers from the whole of Kazakhstan, I mean only English language teachers'* (D1_village1_1T); *'here in the group of the history teachers of the republic I learn a lot of interesting things, and not only related to the subject, but also here we discuss any changes in the education system'.* (D1_village12_1T)

Overall the analysis of the responses related to teachers' membership of virtual professional communities suggests membership was associated with teaching subject, organizational structure and processes of the schools, central system of school governance, and the courses of the in-service teacher training system of the country, offered to support the latest initiatives, namely, the multi-level programme and the updated curriculum.

Although, it was difficult to make a clear differentiation between the groups due to their overlapping and interchangeable nature, teachers' membership of virtual professional communities was divided into two major types, namely, 'common place of work' and 'common course or seminar attendance', that were initiated by the LEA and the in-service teacher training organization or by teachers themselves.

Finally, the analysis of the membership in virtual professional communities of teachers demonstrated that social media served as an instrument for connecting teachers at the school, district, regional and country levels.

However, the above findings suggest that, although some respondents reported their membership of groups at the regional and country level, where they did not know all the members, the majority of respondents reported that their membership of virtual professional communities, consisted of with whom they were familiar. Therefore, it could be suggested that social media platforms were mainly used by respondents in order to support existing relationships. This trend is also reflected in the choice of the platform.

4.1.3 Summary

Overall it seems to be the case that the virtual professional community was a wide-spread phenomenon among teacher respondents, as the majority of them (89.3 %) were members of virtual professional communities. There was also an age factor, with most of the non-members of virtual professional communities being over 50 years old. While teachers use various platforms, at the time of data collection, WhatsApp was the most widely used messenger platform for virtual professional communities among teachers.

The analysis of the responses related to teachers' membership of the virtual professional communities suggest membership was associated with teaching subject, organizational structure and processes of the schools, central system of school governance, the courses within the in-service teacher training system of the country offered to support latest initiatives, namely, multi-level program and updated curriculum.

Although, it was difficult to make a clear differentiation between virtual professional communities due to their overlapping and interchangeable nature, teachers' membership

of virtual professional communities was divided into two major types, namely, 'common place of work' and 'common course or seminar attendance, that were initiated by the LEA and the in-service teacher training organization or by teachers themselves.

Finally, the analysis of the membership of virtual professional communities on the part of teachers demonstrated that social media served as an instrument for connecting teachers at the school, district, regional and country levels. However, an emerging pattern related the membership of the majority of the respondents suggests that social media platforms were mainly used by respondents in order to support existing relationships and that subject was the most commonly mentioned factor with respect to virtual professional communities, of which teachers were members.

4.2 RQ 2: What is the nature of knowledge sharing and receiving in virtual professional communities?

This section presents the findings to answer the second research question. Specifically, it presents the results of thematic analysis relating to the nature of knowledge that respondents shared within their virtual professional networks as well as identified patterns of knowledge sharing and receiving within them. Therefore, the section is divided into three main parts: knowledge; knowledge sharing; knowledge sharing and receiving.
The key findings are:

- The most common form of shared knowledge within virtual professional communities of teachers is news, information, opinions, experience and resources associated with teaching practice and school organizational processes.
- Social media links form an important route for the exchange of information and opinion which saves teachers' time.
- New and experienced teachers use the social media space to exchange teaching experience.
- Both collegial and dialogic knowledge sharing practice takes place.
- Knowledge sharing takes the form of teachers' asking questions and responding directly to these.
- A high proportion of teachers' time is devoted to knowledge receiving rather than knowledge sharing.

4.2.1 Knowledge

The thematic analysis of 41 interview transcripts, indicated the emerging forms of knowledge that teachers had access to within their virtual professional communities. The analysis of interview data showed that there was an active trend towards sharing knowledge, which was manifested in the form of news, information, opinions, experience and resources.

However, because of the overlapping nature of knowledge it was difficult to make a clear distinction, for example, between external and internally developed resources, the precise origins of the experience identified or where the opinions or resources had come from. Therefore, although it is difficult to make a clear distinction between the form of available knowledge within the virtual professional networks of the respondents, the next section will discuss in more detail the patterns of knowledge forms that were identified.

News/ Information

Participation in virtual professional communities seemed to provide an opportunity for teachers to share and disseminate news and information. For example, the WhatsApp groups allowed teachers to share and disseminate news rapidly and at any time so as to increase the efficiency of busy teachers looking for specific information in school. In particular, this was the case during the busy school day, when all the teachers were in their classrooms:

> *During the lessons, we sometimes have changes or for example, changes due to the weather change or we need to assemble so in these cases we always use this group.* (D2_town_1T)

> *For example, sometimes we need to collect something from the district centre, and we can ask in this group if anyone is going there after lunch. Different questions, for example, changes in the lesson timetable.* (D1_village12_1T)

Furthermore, dissemination of ideas and other information about the curriculum or pedagogical approaches can also be exchanged by means of social media due to its easy

and quick-to-use nature. In comparison with email, social media platforms do not require there to be an email list for various colleagues who are from different schools, districts and regions.

> *In other groups it is interesting for me to have an exchange of information with other colleagues, get something new. For example, we have a group in relation to the updated curriculum where members are teachers I was trained with. In this group we also have our trainer. She shares all the news, for example, about various events, conferences, contests, and this is the quickest way, because sometimes such information does not reach our school* (D2_village10_1T)

> *For example, teachers share the information regarding upcoming seminars for English language teachers in one or another region (or district); they just a take picture and share it with us and say you are welcome.* (City_3T)

Moreover, virtual professional communities can be accessed by teachers who can simply 'lurk' and still be able to find out about recent developments.

> *Sometimes news, what is going on in our district, sometimes in different districts, because in my course group we are from different districts of our region.* (D1_village6_2T)

> *Various pieces of information, including different links that are circulated in various groups, come to our school group as well; we share necessary information in our group so that our teachers are also informed.* (D1_village12_1T)

I can't be active in all of my group chats; I simply don't have time for that. Therefore, I try to read and respond to the group chats of the deputy heads from different districts and regions. Those people are considered to be 'the heart of the school' and they are more informed. (*D2_town_1T)*

Opinion

Virtual professional communities provide an opportunity for teachers to share their opinions in online and asynchronous discussions. At schools, teachers mostly use social media to share their opinions in order to organize their work more efficiently:

Sometimes our head of school methodological unit shares with us common task, so when it is urgent, we discuss it there or if it is not urgent then we discuss the best time for us to meet for a discussion. (D1_town_1T)

Oh, I have one more group - deputy heads, because I am currently deputy head. In this group, we are all deputy head of the schools within our region and we discuss various issues. (D1_village12_2T)

In addition, teachers participate in virtual professional communities to share their opinions in order to help each other within a country-wide education reform process, particularly in relation to the updated secondary education curriculum:

There is always some sort of discussions in our group. For instance, now everyone is discussing the question of the upcoming teachers' salary increase. (D2_village10_1T)

We often discuss our updated education system, for example next year I will start teaching according to the new curriculum, so we discuss; sometimes I get advice. (D1_village6_2T)

For instance, now in relation to the updated content of the education, in particular we shared our opinions with each other (common course group) about mid- and short-term planning, discussed how everyone is doing it. (D1_town_2T)

If I tell you about our deputy heads' group, we discussed a lot about the moderation process, mostly shared our opinions, how everyone is doing, but sometimes some teachers share their own work to get our feedback and then we share our opinions in relation to it. (D2_town_1T)

Well, recently, one of our colleagues created a textbook and was piloting it so she sent us the link to a website where we can see the book and asked us to make comments there. It is very convenient. (City_5T)

Resources

The thematic analysis of the interview responses also suggests that part of the knowledge within virtual professional communities was related to sharing teaching resources. In particular, the quick and easy nature of social media allows teachers to request or share instantly resources necessary for their teaching practice in relation to their teaching subject:

For instance, I am a biology teacher, and I asked for anatomy related videos. (D1_village13_1T)

For example, video, PPT, everything that could be used during the lesson. Lesson plans teachers do themselves, but such things like ready-made videos or, for example, we have small kids and we are interested in different break-time activities, or colourful visual aids… When I find something interesting, I can share the link with the girls (teachers), saying, 'You can find there something interesting'. (D1_village6_2T)

Mostly examples of tasks for the Olympiad. (D2_village1_1T)

There is a large number of exchanges about content and subject-related resources which are directly linked to the curriculum reform agenda:

> *When somebody finds something new, for instance related to criteria-based assessment. In other words, everything that is interesting for a teacher about teaching practice. If I have something useful, I share it with my colleagues. Mostly I share resources, something that I find and think that this could be very helpful for other teachers as well…. In general, we discuss everything and share links to various websites, which have useful and necessary resources for the updated curriculum.* (D1_village4_2T)

> *Different kinds of instructional guidelines related to summative and formative assessment for history. Lots of guidelines or handbooks in PDF format are shared.* (D1_village12_2T)

> *In our group we share links to journals or newspapers with different critical or informative articles related to the updated curriculum.* (D1_village9_1T).

Experience

Although teachers' experience could be shared when they were sharing their opinions or resources, however, sometimes teachers' experience of doing something might not only be manifested in their opinions or resources, but also in a visual or oral description of their practice without necessarily providing resources or opinions. One of the first patterns related to the present theme is that virtual professional communities also provided mentoring opportunities for novice teachers. Sometimes novice teachers asked for support and guidance from more experienced teachers. This often took the form not only of an opinion or access to a new resource, but also visual or oral descriptions of practice. This is because it is relatively easy to send visual images and oral accounts

rapidly. The next two quotations illustrate how young teachers used their virtual professional communities as a platform where they could obtain mentoring support:

> *Because this is my first year of teaching and, sometimes I don't know how I should write certain things, what forms we should use, and I was helped by my colleagues here.* (D1_village7_1T)

> *Mostly young teachers ask. Because in our course we had a huge range of teachers' experience. We had the youngest teacher who was 22 years old and the oldest teacher was 56. So this 22-year-old teacher just had started working and of course she had a lot of questions.* (D2_village5_1T)

At the same time, teachers used the advantages of social media in order to hear and see school practice beyond their own district:

> *We, for example, have teachers who are members of our district group, but they are also at the same time members of this region-wide group, where we have teachers from different districts. These are teachers who were on the same course as we were. And here we sometimes also consider general questions not directly related to our subject because it is interesting to see how things are done in different districts. For example, I am deputy head and I am interested in some organizational questions, so I can ask: 'How is it in your school?' Because how things are done in my district I know myself. (D1_village12_1T)*

These knowledge sharing communications inform new teachers and teachers who did not attend the formal face-to-face learning sessions about practices. The informal social media links help to sustain and consolidate knowledge sharing well beyond the formal learning settings. In the next quotations both experienced and young teachers also share their knowledge of organizing the teaching and learning processes within their schools in response to curriculum changes:

Because during our course we considered criteria-based assessment and now we share our experience with each other, or sometimes ask each other how they apply something, for example, Bloom's taxonomy, in a particular topic. Recently, I asked my colleague from XXX which textbook publisher they used for the updated curriculum and she told me. (D1_town_2T)

Here we have questions related to teaching instruction and the updated curriculum or sometimes we have technical questions about how to install or fix some programms or, for example, questions that arise when we fill in one e-journal or national automated database. (D2_village10_1T)

For example, as teachers, who have completed the highest level within the Multi-level programme, we have our group, and, for example, now we want to set up a lesson study group in our own schools and we asked each other how everyone organizes this process, whom they include. (D2_village5_1T)

Overall, the thematic analysis of interview responses revealed that the most commonly shared knowledge within virtual professional communities of teachers was in the form of news, information, opinions, experience and resources relating to teaching practice and school organizational process. At the same time, the description of the knowledge demonstrates that novice teachers value knowledge sharing process within virtual professional communities.

Simultaneously, it could be argued that a high proportion of knowledge exchange was driven by external whole-country educational change. For example, teachers used the potential of social media during the process of educational change in order to exchange their opinions: *'For instance, now in relation to the updated content of secondary education, we shared our opinions with each other'* (D1_town_2T), resources: *'In general, we discuss everything and share links to various websites, which have useful and*

necessary resources for the updated curriculum' (D1_village4_2T) and experience: *'because during our course we considered criteria-based assessment and now we share our experience with each other, or sometimes ask others how they apply something, for example, Bloom's taxonomy within a particular topic'* (D1_town_2T). In other words, it seems that a high proportion of knowledge shared within virtual professional communities was driven by the updated State Compulsory Education Standards (SCES), the new curriculum and the assessment system, which was introduced in 2016, and from September 2017 the updated curriculum has been delivered to 42 per cent pupils (1,2,5 and 7th grades) (IAC, 2018).

At the same time, the results of thematic analysis were supported by parallel descriptive data analysis of the survey. Figure 4.10 sets out the results of a thematic analysis based on frequency of responses, revealing that 72 per cent of teachers often received news, 69 per cent obtained different ideas, opinions and experience, while 60.8 per cent received links to other websites within virtual professional communities.

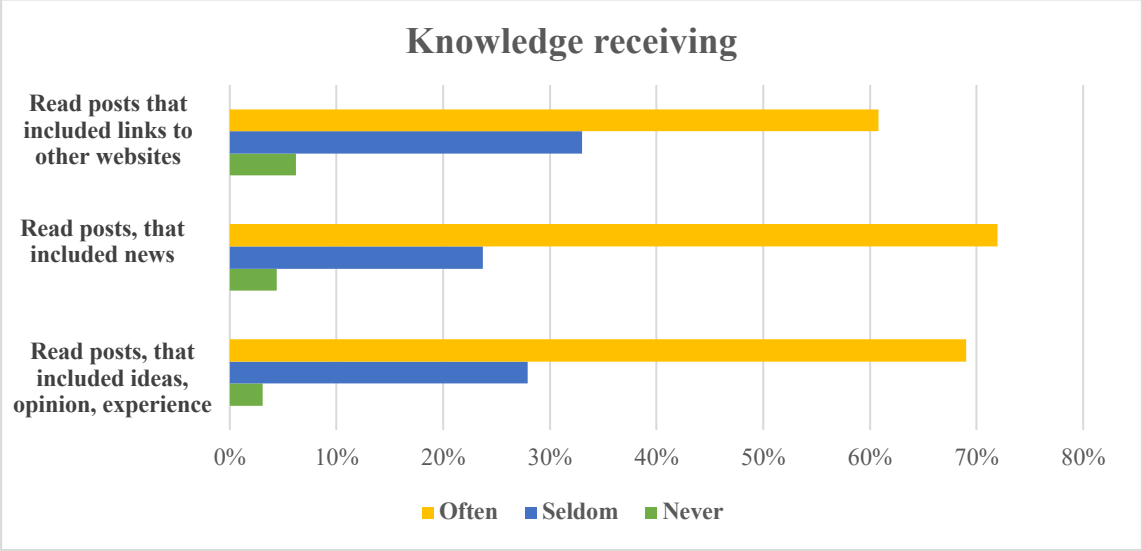


Figure 4.10: Knowledge receiving of the questionnaire respondents

4.2.2 Knowledge sharing

This section will describe the identified themes and patterns emerging from a thematic analysis of the interviews as well as a descriptive analysis of the questionnaire responses used to answer question 3. The major findings of the analysis conducted in this study

suggests that knowledge sharing within virtual professional communities could be divided into the following two types.

The first refers to 'dialogic knowledge sharing' involving most members of the network asking and responding to questions posed within the groups. The second is 'authoritative or disseminative knowledge sharing' that was taking place when one or more members of the network shared, unprompted, new knowledge which was perceived to be useful for the professional development of the groups. Although some teachers reported that they were agents of disseminative knowledge sharing, the majority of teachers reported taking part in dialogic knowledge sharing and that knowledge exchange was mostly happening in response to specific requests.

Dialogic knowledge sharing behavior

Dominating dialogic nature of knowledge sharing was informed by teachers' responses in relation to the knowledge sharing practice in their virtual professional communities. Each interview participant was asked to describe to what extent their groups were active. Although some of the respondents in their explanations used general words such as *'writing'*, *'discussing', 'exchanging',* the majority of teachers described knowledge sharing similar to the dialogic nature, in particular they used the word *'asking':*

> *Well, when we were at school practice [part of a blended in-service teacher training course], we often wrote there, and now not so often, only when someone needs something, do they ask.* (D1_village2_1T)

> *We communicate with each other, for example one teacher from XXX asked recently: 'Girls, could you please share with me resources on different ways to conduct formative assessment; In other words, we ask each other for methodological help [pedagogical knowledge].* (D1_village9_1T)

> *Mostly young teachers, who have just started teaching maths or physics, they always ask something so they can be considered as initiators of group chats.* (D2_village7_1T)

> *Almost every day someone is asking something. Sometimes I ask as well.* (D2_village5_1T)

Asking

The analysis of teacher's responses shows that teachers' dialogue within virtual professional communities was about asking for their opinions, tapping into the group experience and accessing resources, as discussed in the previous section.

Teachers appreciated the opportunity to have follow-up conversations with colleagues they had met on face-to-face courses. Many teachers mentioned value of these follow-up discussions in relation to ideas discussed during the courses as well as further opportunities to discuss their everyday school practice because of the mix of expertise available within these groups. Some teachers pointed to the particular content of the courses as an object for follow-up discussion: '*For example, look, we all took a course together, everything was ok, but when you come home you happen to forget some things and then we start asking questions. For example, at the beginning it wasn't clear how in practice to use the new summative assessment system, but then it became clear'* (D2_village2_1T). Others described follow-up discussions as a platform for making sense of new country-wide educational change: '*Then we have XXX group, this is the group from the updated curriculum course, that I took last year in May…in this group, we find answers only to our questions related to the updated curriculum. It is helpful. I and the others we all share our thoughts there… I ask and always find answers to my questions'* (D1_town_1T)

Having access to the wider community was a real asset for teachers, mainly those from rural schools. These teachers in remote areas emphasized the opportunity available within the groups to communicate with teachers from different districts as well as urban schools.

> *For example, we have teachers in our district group who are also members of this region-wide group, with teachers from different districts, all being together in one course. So, we even sometimes*

solve general questions here in the regional group, as it is interesting for us to learn how it is in other districts. (D1_village12_1T).

Mostly in our regional group LUPS [TLPC – Teacher leadership in professional community], there we have teachers of different subjects and a lot of deputy heads of schools, who are working in urban schools and they somehow get information quicker than we do. So, when we ask something, we always get an answer. For example, you can ask today and in five minutes you will be answered and not by just one answer. (D2_village5_1T).

Furthermore, teachers valued the opportunity to have virtual discussions with other teachers, united by a common place of work (school, district, region). In these, same workplace groups, the discussions were related either to their everyday school practice or particular implementation of a common task or project. Some teachers reported that they commonly asked questions in these groups about their everyday school practice:

For example, I have been working as a deputy head of the school for the first month only, therefore, I am afraid of making mistakes as we [deputy heads] are responsible for many things in schools. Therefore, I often consult others in order to check that I am not mistaken. (D2_town_1T)

Once we created this group and now it is such a convenience. If you don't know anything you can open the chat and ask and will be immediately responded to. (D2_village11_1T)

Teachers working on a common project or task also created groups which engaged in dialogic knowledge sharing.

For example, recently we were planning to participate in competition-exhibition, so there we had a lot of questions, and I

asked this group about presentation requirements and some organizational questions. (City_5T)

The process of using virtual professional communities to engage in dialogic knowledge sharing has now become commonplace. As a result, when new educational change initiatives, like the updated curriculum, are introduced, new virtual professional communities are established as a matter of routine to help teachers to make sense of educational change:

In our group we always have a dialogue. We discuss different topics, for example, now we have the process of updating the content [of secondary education system] and a lot of new things, new information. So, we are sharing, sharing our opinions and teachers respond to each other or comment… for example, sometimes I need some resources, maybe someone has what I need. So, you ask, and people share. (D1_village1_1T)

Well, now we have the updated curriculum, we have a lot of teachers with few years of experience, so they are asking a lot of questions in relation to interactive teaching methods and, in general, in relation to lessons. Then this summative assessment has raised so many questions about how to conduct it. (D2_village5_1T)

Figure 4.11 shows the percentage of the 391 teachers surveyed who used the opportunity in the virtual professional networks to ask their colleagues for ideas, opinions, experience and resources. There was a large group of 'lurkers', 47 – 45 per cent who did not ask questions; however, they reported that they were active knowledge receivers within virtual professional communities. Although these teachers might not have contributed to the dialogic knowledge sharing process, they had access to new knowledge through the shared knowledge available in the virtual professional communities.

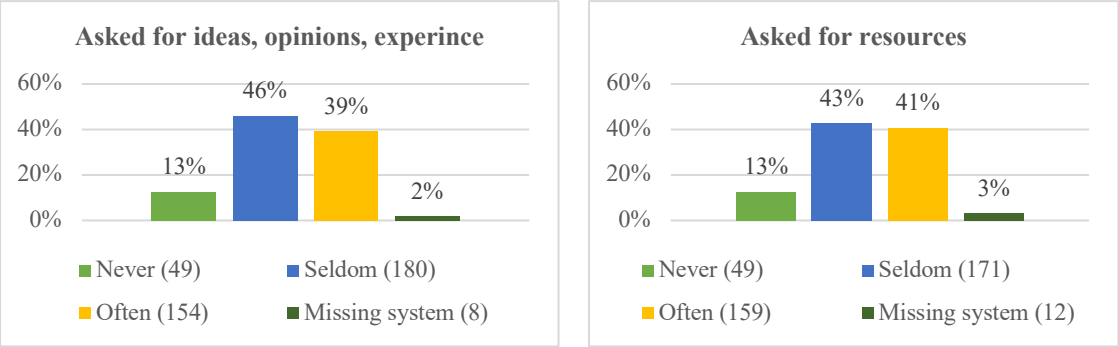


Figure 4.11: Knowledge sharing of the questionnaire respondents (asking)

Responding to questions

The dialogic nature of knowledge sharing within virtual professional communities was also supported by teachers' responses in relation to their knowledge sharing upon the request:

> *Teachers share when you ask them. When you ask, they help and explain.* (D1_village13_1T)

> *I am sharing something only if I am asked, because I think that if people don't ask, there is no need to share with everyone.* (D1_town_4T)

> *...and if colleagues, for example, ask for help, I think they are facing the same challenges as I sometimes do and, therefore, I always try to help.* (D2_town_1T)

In addition, other responses suggest that teachers react to specific questions within their groups:

> *As for me, for example, I don't usually ask questions, like sharing my problems or asking for something, but if someone asks something, then I respond and help as much as I can.* (D2_village10_1T)

> *Most often I participate in discussions.* (D2_village8_1T)

Most often I check those groups where I am an administrator, as I am leading those groups and I feel a responsibility, but as for all other groups I mostly receive information. This means I always read what teachers post in other groups but answer if only necessary. (D1_town_3T)

Overall, corresponding with the reported knowledge demand, teachers described that they responded to their colleagues by providing resources, opinions or experience:

In order to avoid overloading our chart, we mostly send a direct email, so whoever is in need they provide an email address, not for everyone, but for those who asked…. And I mostly write here SMU because there are a lot of questions that I don't agree about. Sometimes I write about what I agree with, sometimes with what I disagree. (D1_village3_1T)

…for example, someone could share a document and I can respond, I mean put 'like' or share my opinion in relation to it or say thank you. (D2_village6_1T)

Figure 4.12 presents a descriptive analysis of the questionnaire responses and confirms the responsive nature of knowledge sharing within virtual professional networks of teachers where only 12 per cent never respond with.

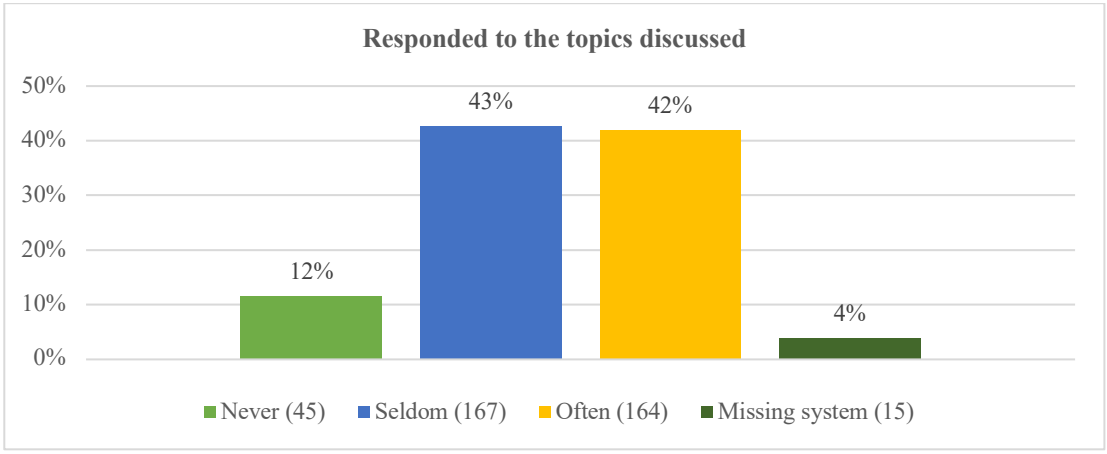


Figure 4.12: Knowledge sharing of the questionnaire respondents (responding)

In summary, the analysis of quantitative and qualitative data within the study suggest that most common knowledge sharing within virtual professional communities of the respondents could be described as dialogic knowledge-sharing. It could be argued that teachers use the opportunity within virtual professional communities to engage in dialogue to ask colleagues' opinion, experience and resources. There is evidence of virtual professional communities were considered as opportunity for follow-up discussion in relation to ideas discussed during the face-to-face courses or seminars as well opportunity to discuss their every-day school practice or implementation of a common task or project.

Disseminative knowledge sharing

Interview responses also showed that some teachers took on a more authoritative role in relation to disseminating news and new information or resources:

> *Sometimes, for example, if I have learnt I know something from the trainers' group then I share it with this group so that they also know.* (D1_town_2T)

> *…and as for my district group, here I can sometimes boast about what I have conducted and share a script.* (D1_town_5T)

> *In our group only professional issues. We share various articles in relation to the current updated (curriculum), links to various newspapers or journals, where we can find such information, this kind of stuff we are sharing.* (D1_village9_1T)

> *For example, I have one fellow group member, so she is always sharing her experience through photos…for example, if she is organizing open weeks, then she will take a photo and share with us. But as for me, I can't, may be, I don't have time, maybe I don't think it is to be necessary or maybe I am not such an open person as she is?* (D1_village12_1T)

> *Mostly I share concrete resources that I find and that I think could be helpful for teachers, then I send it. Then various links for the websites where teachers can find useful information.* (D1_village4_2T)

Although proactive teachers could be considered as agents of disseminative knowledge sharing, by circulating information, news or resources, those teachers, who were part of school leadership teams seemed to be the constant initiators of discussions in their schools, both because of the job responsibilities and opportunity for additional access to knowledge:

> *I also have a group of homeroom teachers in our school, where I am admin and within all my groups, I am the most active, I am here. Here we solve various issues.* (City_2T)

> *I often forward, for example, I see something interesting in one of my groups then I forward it to another and often to my own school.* (D1_village12_1T)

At the same time, teachers' responses indicate that representatives of local educational authorities and trainers in the in-service teacher training system used social media platforms to disseminate their knowledge:

> *Well, yes, in this group, we have an administrator, our head of District Methodological Unit, She created this group and added necessary people. So, at the beginning of school year, we were solving issues related to the updated curriculum.* (D1_village10_1T)

> *We also have a district-wide deputy heads group, from which we know what new things are going on in our district, then a region-wide deputy heads group where we get region-wide news.* (D2_village2_1T)

> *In this group we have our trainer, and she is always sharing information about various competitions and invitations to participate.* (D1_village3_1T)

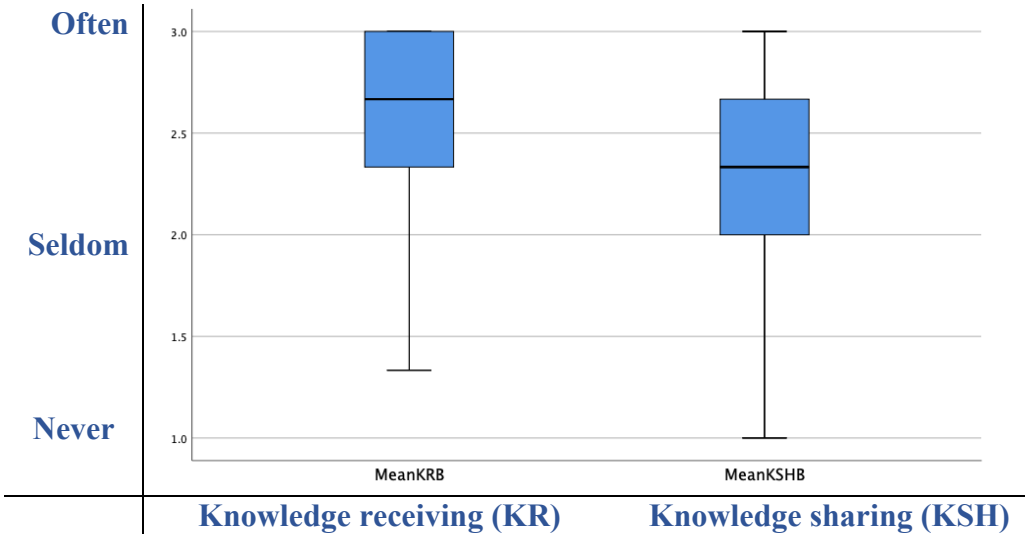
It seems to be the case that as well as those proactive teachers, disseminative knowledge sharing was associated with those who were responsible for teachers' learning and teaching practice in schools. It is difficult in this research to argue that virtual knowledge sharing takes place beyond the sample in the study, however, in a previous research study of school leaders (Wilson et al., 2016) showed that there are already a range of face-to-face networks in existence. Therefore, it could be suggested that disseminating knowledge via virtual professional networks of teachers could become one of the options for school leadership teams, representatives of local educational authorities and trainers within in-service teacher training system in Kazakhstan.

Although virtual professional communities of teachers could become an even more important conduit for both dialogic and disseminative knowledge sharing, at the classroom level, the majority of teachers were shown to exercise dialogic knowledge sharing within virtual professional communities. Therefore, since dialogic knowledge sharing is the most common form of knowledge sharing, further quantitative and qualitative analysis of knowledge sharing will consider only teachers' asking and responding practice.

4.2.3 Knowledge sharing and receiving

The study was not able to capture transcripts of virtual interactions and hence to evaluate the degree of interaction in the form of teachers' asking and responding within virtual professional communities. Therefore, this section presents the findings of the analysis that aimed to compare knowledge sharing and receiving self-reported practice within virtual professional communities.

Overall, the results of descriptive analysis of questionnaire data relating to teachers' knowledge sharing suggest that dialogic knowledge sharing was less common practice than knowledge receiving (figure 4.13).



	N	Valid Percentage	Mean	Std. Deviation	95% Confidence Interval for Mean Lower Bound	Upper Bound
KSH	366	93.6%	2.30	.523	2.24	2.35
KR	382	97.7%	2.63	.454	2.58	2.67

Figure 4.13: Knowledge sharing and receiving of the questionnaire respondents

This is supported by thematic analysis of interview data, because respondents reported a higher proportion of their time was spent on receiving knowledge within the virtual professional communities: *'Probably I am mostly reading'* (D1_village11_1T); *"I am mostly reading"* (D1_town_5T); *'I am mostly receiving information; this means I am mostly reading and looking through'* (City_1T); '*I am looking through every day, but comment – no, not every day'* (D1_village1_1T); *'I am more passive, I read everything and find answers to my questions'* (D1_village12_1T); *'Nowadays, there is a lot of information and therefore, I am trying to be able at least to read and filter it' (D2_village6_1T).*

On the one hand, teachers exercise knowledge sharing within virtual professional communities because of the possibility of saving time: *'Using virtual network allows me to get information or announce something very conveniently and quickly'* (D2_town_1T); *'This is convenient, quick, and, basically it is productive*' (D1_village7_1T); *'Speed, instant exchange'* (D2_village5_1T); '*Quick response'* (D1_village4_2T).

However, on the other hand, time was also been identified as one of the forces that hindered active knowledge sharing practice: *'I am mostly reading, don't have time'* (D1_town_4T). In this regard, some teachers mentioned the lack of time during working hours and others reported the lack of time due to information overload:

> *I don't have time as I am teaching. Of course, later I can respond, but it could be late as someone has already responded.* (D2_village10_1T)

> *Of course, I read everything, look through from time to time, because nowadays there is a huge amount of information and, therefore, I try at least to be able to read and filter in order not be left behind.* (D2_village6_1T)

4.2.4 Summary

Overall, the findings relating to the second research question suggest that the most common form of shared knowledge within virtual professional communities of teachers was in the form of news, information, opinions, experience and resources, and was associated with teaching practice and school organizational processes. Teachers identified links to and membership of virtual professional communities as being a vital and immediate source of up-to-date news.

Social media links formed an important route for the exchange of information and opinion, and as a result of access to this knowledge, teachers were able to organize their work more rapidly and efficiently. In some cases, teachers used the space of virtual professional communities to exchange opinions and engage in discussions, including how to interpret and implement the new curriculum changes being made within the country. Teachers from different schools were able to rapidly exchange teaching ideas and resources as they developed their own curriculum and assessment systems in response to the large-scale country-wide reforms.

New and experienced teachers used the social media space to exchange teaching experience, novice teachers particularly used this opportunity as part of their mentoring

support; some teachers used it to hear and learn about school practice in different districts as well to exchanging experience related to the current changes in the secondary education system. A high proportion of knowledge exchange was driven by educational change taking place across the whole country and new knowledge about this was being shared within virtual professional networks of teachers.

The study differentiates knowledge sharing practice into collegial or dialogic and disseminative forms, with dialogic knowledge sharing referring to knowledge sharing practice involving asking and responding to questions or comments, while disseminative knowledge sharing involved circulation of knowledge, and suggested that although virtual professional communities of teachers could potentially have both dialogic and disseminative nature of knowledge sharing, the majority of teachers reported dialogic type of knowledge sharing.

Conceptualizing knowledge sharing within virtual professional communities as teachers' asking and responding, findings from both qualitative and quantitative data suggest that high proportion of teachers' time when participating in virtual professional communities was devoted to knowledge receiving rather than knowledge sharing. With regard to the present findings, the results of thematic analysis of interview transcripts identified the theme related to the paradoxical aspect of time. On the one hand, teachers exercised knowledge sharing in virtual professional communities because it afforded the opportunity to save time but, on the other hand, time was identified as one of the forces that hindered dialogic knowledge sharing practice.

4.3 RQ 3: *To what extent and in what ways is the need for professional connectedness and knowledge sharing self-efficacy associated with knowledge sharing and receiving in virtual professional communities?*

This section presents findings relating to the final research question. Data drawn from the survey of 391 teachers as well as 41 teachers' interviews have been used to write this section. The survey data also included 391 teachers' responses regarding their knowledge sharing and receiving, their self-evaluation of knowledge sharing self-efficacy and opinions regarding the need for professional connectedness. The 41 interview transcripts

included teachers' responses regarding their sharing of knowledge and factors that hindered them from doing so. As this was a mixed-method study, constant comparison of identified findings from quantitative and qualitative analysis have been used. Therefore, the findings for the third research question will be presented in three sub-sections.

- The results of structural equation modelling
- Need for professional connectedness
- Knowledge-sharing self-efficacy

The key findings are:

- Knowledge sharing within virtual professional communities is partially associated with teachers' need for professional connectedness and knowledge sharing self-efficacy;
- Knowledge sharing self-efficacy may be related to teachers making comparison with other teachers;
- Teachers' knowledge sharing self-efficacy may be associated with affective state within the group. Informal learning within virtual professional networks takes place when there is established professional connectedness and teachers are confident about sharing knowledge within virtual communities;
- Connections and increased confidence within the communities have been established through prior face to face meetings;
- Contextual factors associated with the need for professional connectedness in virtual professional communities could partially be related to the need for mentoring support, the context of educational change and the context of rural schools.

4.3.1 Results of structural equation modelling

Structural equation modelling (SEM) is used here to probe for potential relationships between knowledge sharing self-efficacy, the need for professional connectedness, knowledge sharing and receiving using the 391 responses from teachers as the data sample. Figure 4.14 presents the conceptual model depicting the hypothesised relationships between the identified variables within the conceptual framework of the present study.

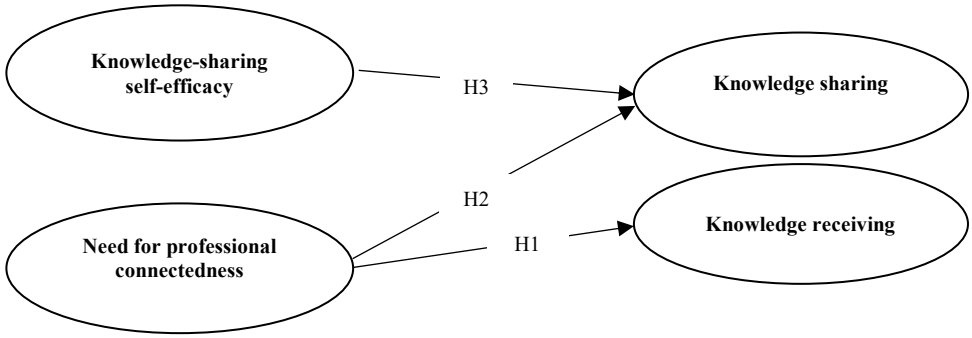


Figure 4.14: Conceptual model depicting the hypothesised relationships among identified variables

In particular, the triangular relationship within the identified conceptual framework was designed to explore opportunities for informal learning within virtual professional communities (chapter 2, section 2.4) suggested the following hypotheses (figure 4.14):
H1: Need for professional connectedness is positively related to knowledge receiving.
H2: Need for professional connectedness is positively related to knowledge sharing.
H3: Knowledge sharing self-efficacy is positively related to knowledge sharing.

This section sets out how structural equation modeling has been used as a quantitative analytical research technique along with qualitative methods. To do so, the section, firstly, presents how prior to performing the analysis, the assumptions behind SEM were tested and addressed in order to mitigate potential bias. Secondly, the section presents the result of measurement model and finally presents the results of structural model.

4.3.1.1 Addressing potential bias

Since, "correlation coefficient can be drastically affected by a single outlier" (Schumacker & Lomax, 2016, p.35), prior to obtaining the final data for SEM, the data were inspected for outliers. In accordance with the option pointed out by Kline (2011) as a result of univariate outliers check, eight outliers within one independent variable (2.3%) and five outliers within the second independent variable (1.4%) were converted to the next most extreme score in order to reduce their influence, while still being retained. This procedure led to the absence of univariate outliers within the data set.

Overall, all latent constructs demonstrated a reasonable normal distribution (table 4.3). The values for the original and trimmed mean of each construct did not vary markedly. None of the values of skewness and kurtosis was larger than 1.0 or less than -1.0, suggesting normality of each latent variable. The shape of score distribution for each latent variable could be considered to be reasonably normally distributed, which is supported by normal probability plots. The comparison of the original mean with a 5 per cent trimmed mean, suggesting that extreme scores did not influence the mean.

Table 4.3: Normality assumption check

Construct	Valid		Mean	5% Trimmed Mean	Std. Error	Skewness	Kurtosis
	N	%					
Knowledge sharing self-efficacy	343	87.7%	3.57	3.60	.046	-.222	-.465
Need for professional connectedness	364	93.1%	3.57	3.58	.038	-.435	-.070
Knowledge receiving	382	97.7%	2.63	2.63	.023	-.949	-.303
Knowledge sharing	366	93.6%	2.30	2.32	.026	-.371	-.583

To check multivariate normality and outliers Mahalanobis's distance (MD) was calculated and examined across two independent variables (knowledge sharing self-efficacy and the need for professional connectedness with each dependent variable (knowledge receiving and knowledge sharing). The results of residual statistics within both calculations demonstrated that the maximum MD values (9.847 and 9.739) were not greater than the critical χ^2 value 13.82 (two predictors with $p = .001$). Checking assumptions related to the errors (residuals) in the model, the values of the residuals were plotted against the corresponding values of the outcome predicted by identified models. Plots of standardized residuals against standardized predicted values as well as partial plots of the outcome variables against each of the predictor variables indicated that the assumptions of linearity and homoscedasticity were met. The check of autocorrelation in residuals indicated independence of residuals as Durbin-Watson statistic was between 1.8 and 2.1.

With the aim of checking collinearity among two independent variables, the correlation matrix was examined, and the results indicated the absence of collinearity. Substantial

collinearity could be indicated by bivariate correlations higher than 0.7 and further examination of squared multiple correlation (R^2) supported this assumption, as R^2 (0.55) was less than .90. The value for both the tolerance ($1-R^2$) and variance inflation factors (VIF) was 1.00, indicating a lack of multicollinearity (Hair et al., 2014).

Missing data within the present latent variables were analysed following Hair et al.'s (2014) four-step process for identifying missing data and applying remedies. All missing data within these four latent variables were unknown but could not be ignored as this was a respondent's non-response. Descriptive statistics of missing values (table 4.4) illustrate the extent of missing data (each variable from 0.5% to 9%), suggesting that it is possible to be remedied (Hair et al., 2014). To this end, missing data were classified using the Missing at Random a diagnostic test which was performed separately for each latent variable (table 4.4). No significant differences were found between the pattern of missing data and the pattern of random missing data process. Since any imputation method is possible when the amount of missing data is less than 10 per cent (Hair et al., 2014), a model-based imputation method was chosen for the remedy for these data, in particular expectation-maximization algorithm.

Table 4.4: Check of missing data

			Missing		Little's MCAR test		
Construct	Item	N	Count	Percentage	Chi-Square	DF	Sig
Knowledge sharing self-efficacy	1	378	13	3.3	30.643	42	.903
	2	365	26	6.6			
	3	362	29	7.4			
	4	365	26	6.6			
	5	356	35	9.0			
The need for professional connectedness	1	374	17	4.3	8.621	8	.375
	2	372	19	4.9			
	3	378	13	3.3			
Knowledge receiving	1	387	4	1.0	3.236	7	.862
	2	389	2	.5			
	3	385	6	1.5			
Knowledge sharing	1	383	8	2.0	8.341	8	.401
	2	379	12	3.1			
	3	376	15	3.8			

4.3.1.2 Results of measurement model

Model estimation was performed using the maximum likelihood (ML) method (default settings). The ML estimation uses the minimum fit function value. Therefore, before the model achieved the 'best fit', the measurement model was evaluated and re-specified, and as a result the minimum-fit function chi-square for the present model was achieved. Overall, the results of Confirmatory Factor Analysis (CFA) demonstrated a satisfactory model fit (table 4.5).

Table 4.5: Overall fit index of the CFA model

Result (Default model)	Fit index	Scores	Recommended threshold	References
Number of distinct sample moments: 105 Number of distinct parameters to be estimated: 36 DF (105 - 36): 69 Chi-square = 121.602 Probability level = .000	CMIN/df	1.8	≤ 3	Hair et al. (2014);
	GFI	.96	≥.95	Hoelter (1983);
	RMSEA (90% CI)	.04 (.03-.06)	≤.06 ≤.08	Hu & Bentler (1999); MacCallum et al. (1996);
	SRMR CFI TLI	.04 .97 .97	≤.09 ≥.95 ≥.95	Hu & Bentler (1999);
	IFI	.97	≥.95	Bollen (1989).

The hypothesized model was supported, chi-square (69, N=105) = 121.602, $p < .001$. However, a large number of variables generated large chi-square values and many degrees of freedom, therefore examining their ratio led to a more meaningful summary (Marsh & Hocevar, 1985). To this end, as relative chi-square (chi-square /degrees of freedom) with ratios of the order of 3:1 or less are associated with best fit models (Hair et al., 2014), my model suggested an inadequate fit with a value of 1.8. However, Hair et al. (2014) also point out that recent developments with regard to different fit indices has resulted in a rare report of goodness-of-fit index (GFI), my study model had a value of 0.96 for GFI which was adequate, being within the range of 0 to 1, which is considered to be a good fit. Furthermore, using the widely used model fit indices, the Root Means Square Error of Approximation (RMSEA) my study was 0.03 and 0.06 with 90 per cent confidence, which also suggested a good model fit. Another index which, as well as RMSEA, has been named as a badness-of-fit measure is Standardized Root Mean Residual (SRMR) and my model with a value (0.04) also suggested an adequate fit.

Finally, incremental indices, as suggested by Bentler (1992), compared with the Normed Fit Index (NFI), Comparative Fit Index (CFI) also provide indices for consideration. As shown in the table 4.5, the CFI fit index for the present model (0.97) could be considered as a representation of a well-fitting model (Hu & Bentler, 1999). Similar to NFI but with consideration of a degree of freedom (Bollen, 1989), the Incremental Index of Fit (IFI) was selected for examination of the present model. IFI (0.97) was consistent with CFI (0.97) while representing a well-fitting model. Finally, the Tucker-Lewis Index (TLI) fundamentally similar to the NFI, but different because this is a comparison of the normed chi-square values for the null and identified model, which in a sense considering the complexity of the model (Hair et al., 2014). TLI for the present model (0.97) suggested a good fit.

Therefore, the results of the overall fit indices of the measurement model suggested that the model fitted the data. Examination of the value of Hoelter's (1983) Critical N (CN) for the present hypothesized model suggested that the size of the sample (N = 391) was satisfactory as both .05 and .01 CN values of the hypothesised model were > 200 (287 and 319 respectively).

At the same time, it should be mentioned, that my model fit values were achieved as a result of several re specifications of the model, particularly as a consequence of inspection of correlation residuals and modification indices. Hence, the presented model has two residual correlations of the following items: '*Confidence in sharing an opinion'* and *'Confidence in sharing an opinion even if it is different from others' (0.43)*; *'Confidence sharing teaching experience'* and *'Confidence sharing ideas about teaching (0.46).*

Internal reliability

Internal reliability of measures was tested by examining the individual Cronbach's alpha coefficient (table 4.6). It could be seen from the table that three constructs (KSSE, NPC, KRB) demonstrate adequate internal consistency as Cronbach's Alpha coefficients ranged from 0.7 to 0.9 and were all higher than the recommended level of 0.7 (Hair et al., 2014).

Table 4.6: Validity and reliability of the measurement scales

Construct	Internal reliability		Convergent validity			Discriminant validity			
	Alpha	Item	Loading	CR	AVE	KSHSE	NPC	KR	KSH
KSHSE	0.90	1	.792	0.90	0.59	0.77			
		2	.756						
		3	.757						
		4	.785						
		5	.751						
NPC	0.69	1	.705	0.70	0.43	0.30	0.66		
		2	.650						
		3	.607						
KR	0.72	1	.656	0.72	0.47	0.27	0.39	0.68	
		2	.742						
		3	.651						
KSH	0.68	1	.747	0.70	0.44	0.34	0.34	0.54	0.66
		2	.726						
		3	.492						

However, as pointed out by Clark and Watson (1995), it is difficult to provide clear cut-off values for acceptable reliability indices to show the homogeneity of a scale. Therefore, they argue that for homogeneity to exist, internal consistency is required but is not a sufficient condition (Clark & Watson, 1995). In this regard, following recommendations of Cortina (1993) and Clark and Watson (1995), in order to establish unidimensionality, principal-component analysis of a set of items was performed.

Therefore, four constructs were firstly assessed in relation to factorability (table 4.7). The Kaiser-Meyer-Olkin value ranged from 0.622 to 0.823, which exceeded the recommended value of 0.6 (Kaiser, 1970,1974) and Bartlett's Test of Sphericity achieved statistical significance (p=0.000), supporting the factorability of the correlation matrix. Principal component analysis extracted one component with an eigenvalue exceeding 1 within each construct, explaining 72.3 per cent, 61.9 per cent, 64.2 per cent and 61.1per cent of the total variance, demonstrating a strong loading range of between 0.669 and 0.854 (table 4.8), as Clark and Watson (1995) suggest retaining items above .40. Therefore, principal component analysis suggested that one factor solution was appropriate within each construct.

Table 4.7: Factorability check

		KSHSE	NPC	KR	KSH
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.823	.668	.667	.622
Bartlett's Test of Sphericity	Approx. Chi-Square	1186.548	195.311	234.665	209.179
	Df	10	3	3	3
	Sig.	.000	.000	.000	.000
Extraction Sums of Squared Loadings	% of Variance	72.3	61.9	64.2	61.1
	Cumulative %	72.3	61.9	64.2	61.1

Table 4.8: Loadings within factorability check

Constructs	Component 1
Knowledge Sharing Self-Efficacy (KSHSE)	.810
	.836
	.846
	.854
	.844
Need for Professional Connectedness (NPC)	.795
	.801
	.764
Knowledge Receiving (KR)	.779
	.839
	.785
Knowledge Sharing (KSH)	.831
	.834
	.669

Convergent and discriminant validity

In accordance with the recommendation of Hair et al. (2014) , the convergent validity was evaluated by means of three measures, (1) statistically significant factor loadings with values greater than 0.5; (2) values of composite reliability (CR) greater than 0.7; and (3) average values extracted (AVE) greater than 0.5. As can be seen from the table 4.6 all factor loadings were statistically significant at the 0.001 level and ranged from 0.492 to 0.792, and although one factor loading was 0.492, it could be considered significant due to the present sample size as a factor loading of 0.4 is significant with a sample size of 200 (Hair et al., 2014). CR values were ranged from 0.70 to 0.90.

As for the AVE, the value for one variable was 0.59, whereas the other three values were equal to almost 0.5 as they were 0.43, and 0.47. However, as suggested by Fornell and Lacker (1981), AVE of less than 0.5 could be still adequate if CR were higher than 0.6. To this end, CR for the present variables ranged from 0.70 to 0.90. As suggested by Fornell and Lacker (1981), AVE is used to assess discriminant validity. In this regard, it was assessed by comparing the square root of the AVE with the correlations between the variables. Table 4.6 shows that the square root of the AVE for each variable was greater than correlations between them. Absence of multicollinearity issues could also be seen due to the absence of high correlations between constructs. Overall, the measurement model demonstrated sufficient and adequate reliability, convergent validity and discriminant validity.

4.3.1.3 Results of structural model

The analysis of the structural model used two exogenous latent constructs (knowledge sharing self-efficacy (KSHE) and need for professional connectedness (NPC)) and two latent endogenous constructs (knowledge sharing and knowledge receiving (KSH and KR respectively)). Therefore, the hypothesized within conceptual model (figure 4.15), structural model (model) was assessed in terms of its validity.

The information in table 4.9 demonstrates the overall fit statistics of the specified structural model. The $\chi 2$ is 187.127 with 72 degrees of freedom ($p < .01$). The model CFI is .94 with a RMSEA of .064 and a 90 per cent confidence interval of .053 to .075. It should also be noted that the overall model fit was different from CFA model (table 4.9), particularly noticeable with respect to the increase of chi-square (65.52) and increase of degree of freedom (3) as well as SRMR and RMSEA values. Examination of loading estimates suggest that they did not changed dramatically from the CFA model (table 4.10) apart from eight estimated standardized loadings, with the change ranging from .01 to .05.

Table 4.9: Comparison of goodness-of-fit measures

GOF index	CFA	Model
Absolute Measures		
χ^2 (chi-square)	121.602	187.127
Degrees of freedom	69	72
Probability	.000	.000
GFI	.96	.94
CI of RMSEA	.04 (.03-.06)	.06 (.05-.08)
RMR	.03	.07
SRMR	.04	.10
Incremental Fit Measures		
CFI	.97	94
NFI	.94	91
Parsimony Measures		
AGFI	.94	.91
PCFI	.74	.75

Table 4.10: Comparison of standardized factor loadings

Item	CFA Standardized factor loadings	Model
KSHSE1	.79	.79
KSHSE2	.76	.76
KSHSE3	.76	.76
KSHSE4	.79	.79
KSHSE5	.75	.76
NPC1	.71	.70
NPC2	.65	.64
NPC3	.61	.60
KR1	.66	.66
KR2	.74	.76
KR3	.65	.63
KSH1	.75	.70
KSH2	.73	.78
KSH3	.49	.46

The comparison between the hypothesized model (Model 1) and the CFA model in terms of the structural model estimates (table 4.11) demonstrated that all three structural relationships were supported by significant path estimates. However, since the significant chi-square difference between the hypothesized model and the measurement model (table 4.9), which is 65.52 with three degree of freedom ($p < .001$) and two potential (NPC and KSHSE; KSHSE and KR) excluded structural relationships (table 4.11) this suggested the need for model improvement by adding one or more of these relationships. Moreover, the SRMR value (0.1063) suggested the need for model improvement (table 4.9).

Table 4.11: Comparison of structural relationships with CFA correlation relationship

Model		CFA model	
Structural relationship	Standardized Estimate	Comparable Correlational Relationship	Standardized Estimate
H1: KR<---NPC	0.43	KR correlated NPC	0.39
H2: KSH<---NPC	0.33	KSH correlated NPC	0.34
H3: KSH<---KSHSE	0.28	KSH correlated KSHSE	0.34
Not estimated	-	NPC correlated KSHSE	0.30
Not estimated	-	KSHSE correlated KR	0.27
Not estimated	-	KSH correlated KR	0.54

Therefore, it was decided to add the relationship between the need for professional connectedness and knowledge sharing self-efficacy. To this end, it should be noted that the decision to re specify, on the one hand, was guided by diagnostic measures and, on the other hand, was informed by the theoretical propositions of Bandura (1997) regarding the role of self-efficacy, particularly, the process whereby self-efficacy is likely to produce its effect. Efficacy beliefs regulate people's activity through four main processes, namely, motivational, cognitive, affective and selective, and these "different processes usually operate in concert, rather than in isolation, in the ongoing regulation of human functioning" (Bandura, 1997, p. 116). "Much human behaviour, being purposive, is regulated by forethought that embodies cognised goals. The stronger the perceived self-efficacy, the higher the goals people set for themselves and the firmer their commitment to them" (Bandura, 1997, p.117). At the same time, "personal goals and aspirations, rooted in a value system, provide further incentives and guides for action." (Bandura, 2002, p.4). Therefore, it could be hypothesised that rooted in the value system, professional commitment is manifested through the need for professional connectedness. To this end, as an example of the increased expectancy-value models, Bandura (1997) cites the model of reasoned action (Ajzen & Fishbein,1980), according to which

> the intention to engage in course of action is governed by two components: a personal determinant in the form of perceived outcomes and their valuation; and a subjective normative determinant combining perceived social pressures by significant others to perform or refrain from a given behaviour and one's motivation to comply with their expectations (Bandura, 1997, p.127).

In this way, Bandura (1997, p.127) points out that "perceived self-efficacy exerts similar direct and indirect influence on performance in conjunction with perceived outcomes and social pressure". Therefore, considering teachers' need for professional connectedness within a particular social context as an outcome expectation for participation within virtual professional communities, it could be hypothesised that perceived self-efficacy could also indirectly, through the need for professional connectedness, influence knowledge sharing and receiving within virtual professional communities.

The re-specification of the original model by means of adding the structural relationship between knowledge sharing self-efficacy and the need for professional connectedness suggested that the structural model was an improvement in comparison with the original one. Table 4.12 demonstrates the comparison of goodness-of-fit measures between the original and re specified models.

Table 4.12: Comparison of GOF between original and re-specified models

GOF index	Model	Revised model
Absolute Measures		
χ^2 (chi-square)	187.127	161.207
Degrees of freedom	72	71
Probability	.000	.000
GFI	.94	.95
RMSEA (CI)	.06 (.05-.08)	.06 (.05-.07)
RMR	.07	0.4
SRMR	.10	0.7
Incremental Fit Measures		
CFI	.94	.96
NFI	.91	.92
Parsimony Measures		
AGFI	.91	92
PCFI	.75	75

In particular, the $\chi 2$ value in the re-specified model was 161.207 with 71 degrees of freedom ($p < .01$), demonstrating the decrease of chi-square (25.92) and decrease of degree of freedom (1) in comparison with the original structural model, therefore making it closer to the CFA model (x^2[df] = 121.602[69] $p < .001$). The re specified model CFI is .955 with a RMSEA of .057 and a 90 per cent confidence interval of .045 to .069, also suggesting an improvement in comparison with the original model (CFI = .943; RMSEA

[90% confidence interval] = .064 [.053-.075]). Finally, a noticeable improvement was observed in SRMR value.

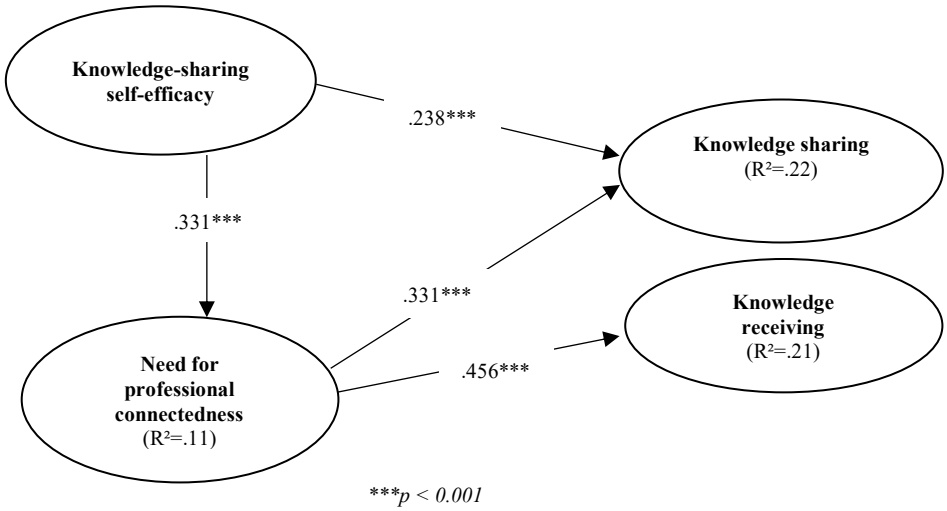


Figure 4.15: Standardised direct path estimates for the re specified structural model

The comparison of structural relationships with respect to the original and re specified model illustrates (figure 4.15 and table 4.13) that two of the path estimates (KR<---NPC and KSH<---KSHSE) from the original model had changed slightly, and the values of the squared multiple correlation for KSH and KR had also improved from .19 and .19 to .22 and 21, respectively, as a result of re-specification.

Table 4.13: Comparison of structural relationships for the original and re specified models

Model		Revised model		
Structural relationship	Stand. Estimate	Comparable Correlational Relationship	Stand. Estimate	SE
H1: KR<---NPC	0.43	H1: KR<---NPC	0.45	0.47
H2: KSH<---NPC	0.33	H2: KSH<---NPC	0.33	0.62
H3: KSH<---KSHSE	0.28	H3: KSH<---KSHSE	0.24	0.41
Not estimated	-	H4: NPC <---KSHSE	0.33	0.51

To assess the mediating role of the need for professional connectedness (NPC) within the relationship between knowledge sharing self-efficacy (KSHSE) and knowledge sharing (KSH), a further analysis was conducted to check the statistical significance and the threshold of the indirect effect. In particular, in accordance with the suggestion of Preacher and Hayes (2008) in relation to the consideration of significance of indirect

effect, the bootstrap confidence intervals method with 1000 iterations was conducted. The results are presented in tables 4.14 and 4.15. The indirect effects of KSHSE on KSH (β = 0.110; $p < 0.001$) and KR (β = 0.151; $p < 0.001$) were supported within the range of confidence intervals. Therefore, the hypothesized path in the process of re-specification was supported (H4 in the table 4.13).

Table 4.14: Direct, indirect and total effect of KSHSE (standardized)

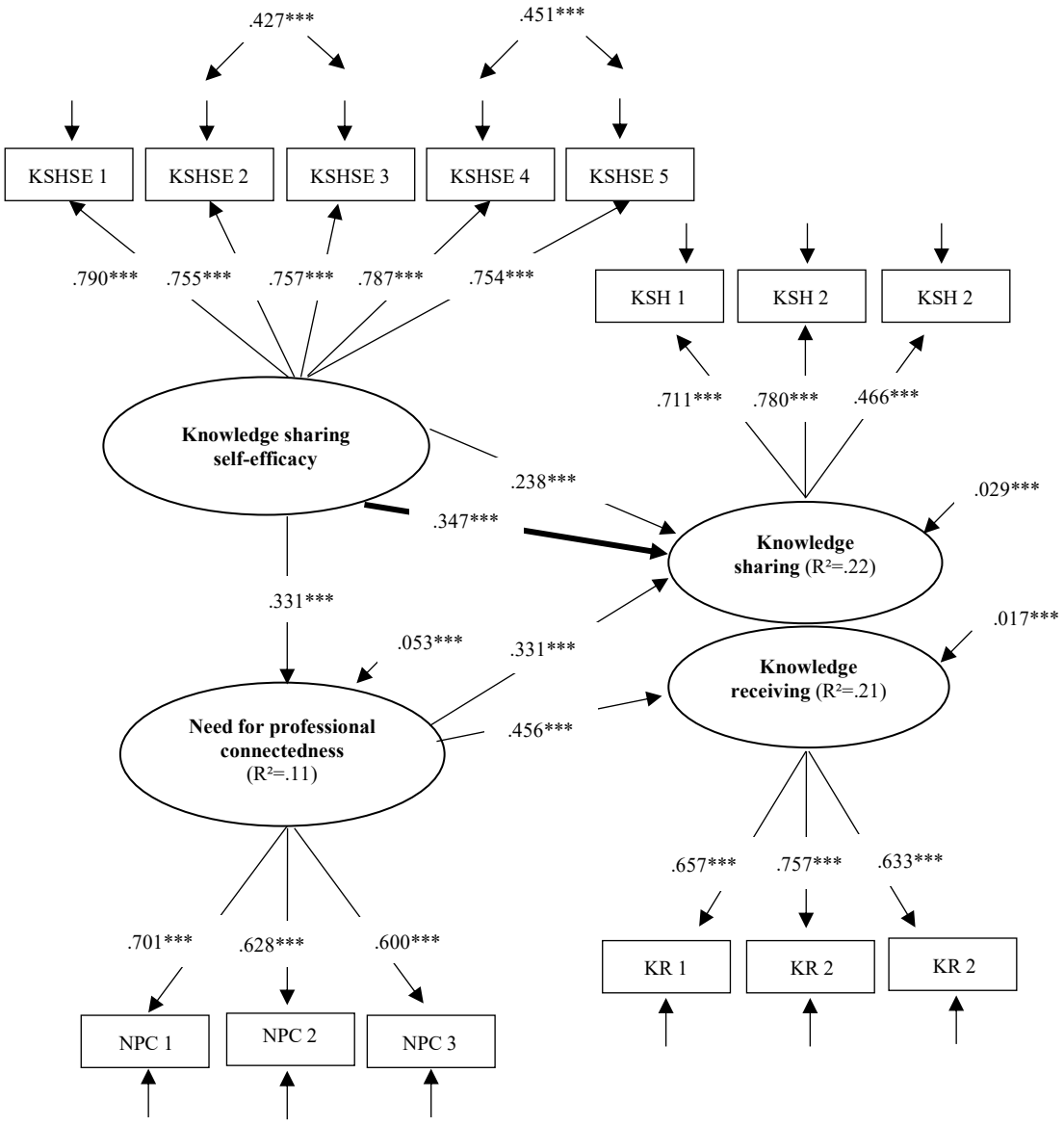
Predictor	NPC	KSH	KR
Direct effect			
KSHSE	.331***	.238***	-
Indirect effect			
KSHSE		.110***	.151***
Total effect			
KSHSE		.347***	
*Note: ***p <0.001*			

Table 4.15: Confidence interval of indirect effect (standardized)

	SE	Bias corrected CI	
Path		*Lower*	*Upper*
KSHSE-> NPC-> KSH	.04	.054	.204
KSHSE-> NPC-> KR	.04	.085	.253

Overall, considering the effects of the need for professional connectedness (NPC) and knowledge sharing self-efficacy (KSHSE), it could be seen (table 4.14 and figure 4.16) that a partial explanation for knowledge receiving (KR) was mostly associated with the need for professional connectedness (direct effect: β = 0.456; $p < 0.01$), rather than knowledge sharing self-efficacy (indirect effect: β = 0.151; $p < 0.01$); while a partial explanation for knowledge sharing was almost equally associated with the need for professional connectedness (direct effect: β = 0.331; $p < 0.01$) and knowledge sharing self-efficacy (total effect: β = 0.347; $p < 0.01$). In this way, the study suggests that while the need for professional connectedness could be considered as a partial explanation of knowledge receiving within virtual professional communities, knowledge sharing within such communities associated with both the need for professional connectedness and knowledge sharing self-efficacy.

Therefore, the results of the final structural equation model suggesting associations of knowledge sharing self-efficacy and the need for professional connectedness with knowledge sharing and receiving in virtual professional communities demonstrated acceptable model fit, and all theoretically hypothesized relationships were supported (figure 4.16 and table 4.16).



Chi-square [df] = 161 [71], $p < .001$; CFI = .955, RMSEA [90% CI] = .057 [.045-.069]; SRMR = .071. ***$p < 0.001$

Indirect effects:
1. Knowledge-sharing self-efficacy on knowledge sharing ($\beta = .110$, CI [.054-.204], $p < 0.001$)
2. Knowledge-sharing self-efficacy on knowledge receiving ($\beta = .151$, CI [.085-.253], $p < 0.001$)

Direct effects →
Total effect ⟹

Figure 4.16: Structural equation model showing associations of knowledge sharing self-efficacy and the need for professional connectedness with knowledge sharing and receiving in virtual professional communities (standardized estimates)

*Table 4.16: Factor loadings (standardized estimates; ***p < 0.001)*

	Latent and observed variables	Measurement model Loadings	SE
Knowledge sharing self-efficacy			
KSHSE1	sharing teaching resources	.790***	.040
KSHSE2	sharing an opinion	.755***	.043
KSHSE3	sharing an opinion even if it is different from others	.757***	.049
KSHSE4	sharing my teaching experience	.787***	.045
KSHSE5	sharing my ideas about teaching	.754***	.046
Need for professional connectedness			
NPC1	makes me feel myself special to be able to connect with teachers from all over the country	.701***	.045
NPC2	gives me a feeling that I am not on my own	.628***	.053
NPC3	I feel myself less isolated from other professionals in my country	.600***	.046
Knowledge receiving			
KR1	read other members' posts, that included ideas, opinion, experience	.657***	.016
KR2	read other members' posts, that included news	.757***	.018
KR3	read other members' posts that included links to other websites	.633***	.021
Knowledge sharing			
KSH1	asked for other members' ideas, opinion, experience	.711***	.028
KSH2	asked for group members' resources	.780***	.030
KSH3	responded to the topics discussed	.466***	.027

The values of variables' standard errors suggest an acceptable estimation (standard errors from .016 to .049) as extremely large standard errors are an indication of parameter's poor determination (Jöreskog & Sörbom, 1993). Standardized estimates of the variables suggest that they had adequate value, as all their values were below 1.00 (Byrne, 2010). However, to test the generalizability of the present model would require further testing with new data.

Overall, the results of SEM within the identified conceptual framework (chapter 2, section 2.4) suggest that the structural model could be considered to provide an explanation for the observed covariance matrix, and in this way supportive of the identified triangular relationship between learning factors, such as the need for professional connectedness, knowledge sharing self-efficacy and knowledge sharing and knowledge receiving, in the process of informal learning within virtual professional communities.

Therefore, in providing opportunities for informal learning for both active and passive participants of virtual professional communities, knowledge sharing is partially associated with the need for professional connectedness and knowledge sharing self-efficacy. In other words, the structural equation model used suggests that the stronger the

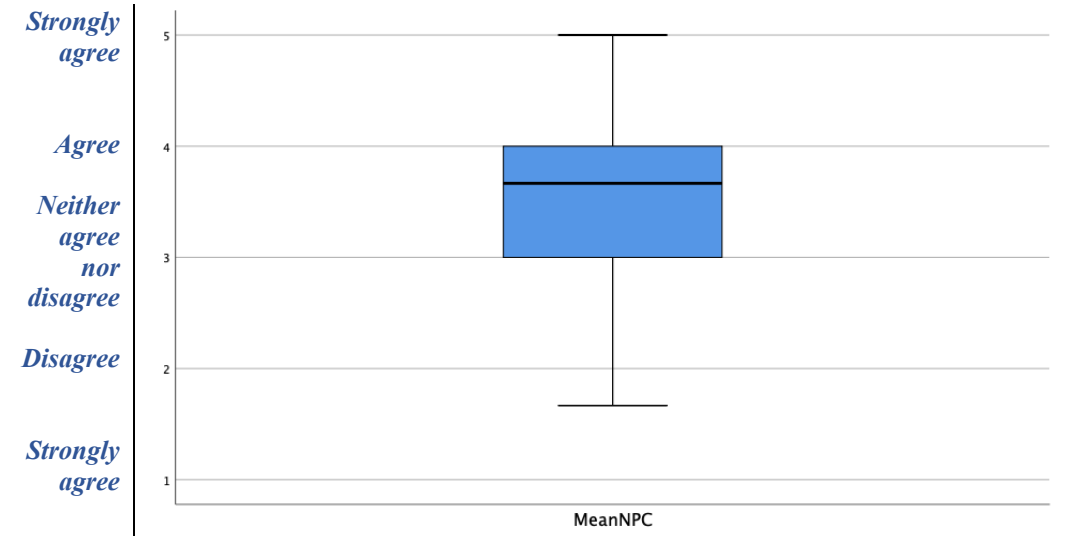
need for professional connectedness and knowledge sharing self-efficacy, the greater the amount of knowledge that would be shared within virtual professional communities of teachers, which in turn could provide an opportunity for informal professional learning.

At the same time, although the present model demonstrated only a one-way relationship between identified variables, there could be a case for the opposite effect, in other words, the need for professional connectedness and knowledge sharing self-efficacy could partially be associated with knowledge sharing and receiving experience within virtual professional communities. However, to test such a hypothesis would require a longitudinal study and therefore is beyond the scope of the present study.

Meanwhile, although the structural equation model confirmed associations of knowledge sharing self-efficacy and the need for professional connectedness with knowledge sharing and receiving in virtual professional communities (figure 4.16), findings within from the present inferential statistical analysis were limited in their ability to provide understanding of the ways that the identified constructs are manifested in the research context. In this regard, the analysis of face-to-face interview transcripts in the present study suggested some patterns in the research context in relation to identified relationships, which will be presented in the following section, that will consider the identified independent variables separately.

4.3.2 The need for professional connectedness

The results of the identified structural equation model (figure 4.16) suggested that knowledge sharing and receiving within virtual professional communities were partially associated with teachers' need to be connected with other professionals. Such a need could be seen more clearly in the visual presentation of descriptive statistics of the survey data (figure 4.17).



N	Valid Percentage	Mean	Std. Deviation	95% Confidence Interval for Mean Lower Bound	Upper Bound
364	93.1%	3.57	.716	3.49	3.64

Figure 4.17: The need for professional connectedness of the questionnaire respondents

This finding is supported by the thematic analysis of the interviews. Most of the teachers' responses to the questions related to their reasons for using social media for professional networking were related to the need for professional connectedness as part of their professional identity, such as the need for constant learning and professional community membership:

> **Professional update from other colleagues:** *well, you are always up-to-date, always aware of latest changes, know how other people work.* (D1_town_4T)

> **Professional learning from other colleagues:** *Very useful for me as I try to learn something that I didn't know.* (D1_village13_1T)

> **Professional discussion with other colleagues:** F*irst of all, opportunity for discussions.* (D1_village13_1T)

Firstly, this is communication, discussions related to my pedagogical practice that help to solve various issues. (D1_village4_2T)

A lot of opportunities, for example, exchange of opinions with colleagues around the country, for example, I have colleagues in cities like XXX and XXX, but with the help of virtual networks we are communicating. (D2_town_1T)

Less isolated from other colleagues: *"Well, for me, how people say, 'You are not boiling in your own bowl', sharing your impressions or thoughts and learn something new.* (D2_village8_1T)

Therefore, the findings of the qualitative and quantitative analysis allowed me, first of all, to make an inference that the need for professional connectedness associated with teachers' professional identity. Hence, the findings suggested that part of the variance associated with the need for professional connectedness accounted for teachers' perceptions of their professional identity. To this end, the descriptive analysis of the questionnaire responses as well as thematic analysis of the interview transcripts, presented here, suggested that a high proportion of the research participants felt the need for professional connectedness in a social media space.

At the same time, along with professional identity associated with the need for professional connectedness, the thematic analysis of the interview transcripts reveals three themes, suggesting potential contextual reasons in the research context to be related with need for professional connectedness within virtual professional communities of teachers. The first reason, which could be related to the need for professional connectedness was the need for mentoring support. This was revealed as a result of the analysis of teachers' responses regarding knowledge sharing (section 4.2), which demonstrated that beginning teachers used their virtual professional communities in order to obtain mentoring support: *'...because this is my first year of teaching'* (D1_village7_1T); *'mostly young teachers ask'* (D2_village5_1T).

The second reason, which could be related to the contextual need for professional connectedness within virtual professional communities related to the context of educational change. The analysis of teachers' responses regarding knowledge sharing and receiving practice (section 4.2) demonstrated that teachers commonly participate in virtual professional communities in order to make sense of educational changes. Teachers' responses suggest that quite a substantial part of the knowledge accessed was related to educational change. Specifically, respondents pointed to the opportunity within social media to share their opinions: *'Now in relation to the updated content of education, we particularly shared our opinions with each other'* (D1_town_2T)*;* resources: '*…share links to various websites, which have useful and necessary resources for the updated curriculum'* (D1_village4_2T); experience: *'During our course we considered criteria-based assessment and now we share experience with each other'* (D1_town_2T). Equally, teachers' responses in relation to group membership (section 4.1) could also be seen as a reflection of the need to be connected because of the current educational changes: *"two years ago, I had a course on the updated curriculum, so this is our group, all 34 teachers who were trained together, and we still communicate together with our trainer"* (D2_village8_1T).

The final reason identified as a result of thematic analysis is related to the context of rural schools within a wide geographical school network. The analysis of teachers' responses in relation to knowledge sharing and receiving practice (section 4.2) illustrated that teachers who participated within virtual professional communities did reduce their professional isolation that was a result of the distance between rural schools, and distance between rural schools and the district and regional centres. While some teachers reported the need for connection with rural schools from other districts: *'We even sometimes solve general questions here, in the regional group, as it is interesting for us to learn how it is in other districts'* (D1_village12_1T), others reported the benefit of having virtual professional connections with teachers from urban schools: *'We have teachers of different subjects and a lot of deputy heads of schools, who are working in urban schools and they somehow get information quicker than we do'* (D2_village5_1T).

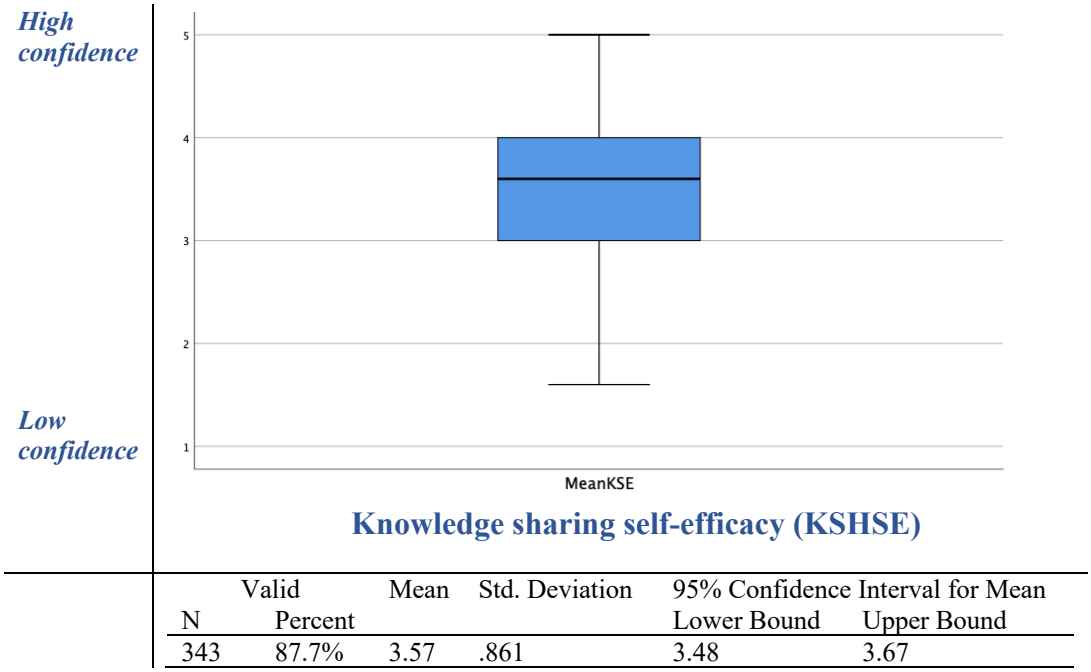
In summary, the analysis of quantitative and qualitative data in this study demonstrated that teachers' knowledge sharing within virtual professional communities was partially associated with the need for professional connectedness. To this end, the thematic analysis of qualitative data suggested that the need for professional connectedness in social media space was associated with teachers' professional identity and commitment for learning as well as contextual factors, such as the need for mentoring support, the educational changes and the context of rural schools.

In other words, reflecting within framework of identified concepts, the findings suggested that the opportunity for informal learning within virtual professional communities is created when there is a need for professional connectedness and this need is partially related to the level of professional identity and commitment for learning. At the same time, the contextual drivers of the need for professional connectedness within virtual professional communities could be related to the need for mentoring support, the context of educational change as well working conditions in rural schools.

4.3.3 Knowledge sharing self-efficacy

The results in relation to the identified structural equation model (figure 4.16) suggested that knowledge sharing within virtual professional communities was associated not only with the need for professional connectedness, but also with knowledge sharing self-efficacy. In this regard, the descriptive statistics of the survey data (figure 4.18) demonstrated that, in general, not all the teachers were confident about sharing their knowledge in the virtual professional communities (1- lowest level and 5 - the highest level).

In this regard, the results of the thematic analysis of interview data could be considered as a lending support to this argument. Reflecting on the responses from the survey, some of the interview participants reported that their overall knowledge sharing self-efficacy could be one of the reasons that they were mostly receiving, rather than sharing, knowledge within their virtual professional communities.



	Valid		Mean	Std. Deviation	95% Confidence Interval for Mean	
N	Percent				Lower Bound	Upper Bound
343	87.7%		3.57	.861	3.48	3.67

Figure 4.18: Knowledge sharing self-efficacy of the questionnaire respondents

One of the proposed patterns identified as a result of the analysis of the interview transcripts suggested that perceived knowledge sharing self-efficacy could be related to teachers' comparing themselves with other professionals, particularly those whom they considered more qualified, experienced or knowledgeable:

> *I haven't shared anything yet, mostly I receive from people, because I have only three years of experience. Mostly I get information from highly qualified teachers. I am afraid to share as it may not be correct* (D1_village13_1T*)*

> *In comparison with other teachers in Kazakhstan I feel, how to say, not enough professionalism, as I need to spend a lot of time before sharing anything. In such groups where there are well-known historians in Kazakhstan, I prefer only to read or respond only when they ask for information that I know. But mostly when they start a discussion about some historical events, I try to keep silence. …Of course, 12 of experience is not small, but I am hesitating, maybe someone has better, I guess, self-confidence, I don't have such confidence yet* (D1_village10_1T)

Equally, teachers' knowledge sharing self-efficacy could be associated with their affective state within groups, particularly the sense of professional connectedness with particular colleagues. The results of interview analysis suggested that teachers tended to exchange knowledge with people to whom they felt they were connected, either because of a common place of work: *'How can you not share if we all know each other; in our own district we all like one family. I think we should work together'* (D2_village2_1T); *'As for my own school group, here I am an active participant* (D1_village10_1T) or because of taking a common course together:

> *Well, I am responding and sharing not to show that I am so clever – no, I don't consider myself more knowledgeable than others. I think the reason is that in our group we have like-minded people, and this is interesting for us…Nobody is shy as we are like-minded people and we have common problem [educational change].* (D1_village9_1T)

At the same time, it could be seen that not all the groups within the identified types had this sense of professional connectedness:

> *It turned out that among all courses that I took, the group from this course is the most like-minded group; here we found a real connection with each other…Somehow, we've become friends, stuck together and I hope we will continue this work, to help each other.* (D2_village8_1T)

> *Overall, in the district group I am not so active when it comes to asking questions, in general we mostly socialize in our district group and, as for our regional group, we mostly receive information as there are so many people whom I don't know, whereas in the district group we all know each other.* (D2_village2_1T)

When something is not clear to me, I ask my school MU group. As for district MU, I prefer to ask directly the head of MU, not members of the group. (D1_village3_1T)

In this regard, the sense of professional connectedness was mostly associated by participants with prior professional relationships, as teachers reported their confidence about sharing knowledge with colleagues whom they had previously met face-to-face**,** suggesting that knowledge sharing self-efficacy was associated with the level of relations:

My most active group is the one where we all know each other; our school group. I think when you actually know person in real life, it is easier to communicate virtually in comparison with those whom you don't know. (D1_town_4T)

Well, I don't know, maybe because we don't know each other and we don't have any relationship, whereas in our district we meet each other at the annual August conferences, in various seminars, in other words, we know each other, and it is easier for us to communicate. (D2_village11_1T)

Well, maybe there is some psychological aspect as in some groups people don't know each other. For example, in my group with deputy directors I don't know eight of the people here, so I don't feel comfortable. (City_2T)

Because when you know people then it is easier to share in comparison with those whom you don't know, where you can just read or get something. So, when we know people face to face in the group, we are sharing our experience and can ask questions. (D2_village2_1T)

If I need to ask, I don't hesitate as I know everyone there. (D1_village2_1T)

In summary, the analysis of quantitative and qualitative data within this research demonstrated that knowledge sharing within virtual professional communities was partially associated with teachers' knowledge sharing self-efficacy. The thematic analysis of qualitative data suggested that knowledge sharing self-efficacy could potentially be related to teachers comparing themselves with other professionals, particularly those whom they considered more qualified, experienced or knowledgeable. Equally, the findings demonstrated that teachers' knowledge sharing self-efficacy could be associated with their affective state within the groups, particularly, their sense of professional connectedness with particular colleagues, and it is suggested that the latter was associated with the level of relationship, as respondents reported confidence about sharing knowledge with colleagues whom they had previously met in real life.

In other words, reflecting within the framework of identified concepts, the findings suggested that the opportunity for informal learning within virtual professional networks was created when, along with the need for professional connectedness, teachers were confident about sharing knowledge within virtual professional communities. Thus, the confidence about sharing knowledge could have been associated with teachers comparing themselves with other colleagues within the groups, whom they considered more qualified, experienced or knowledgeable, and the degree to which teachers felt themselves to be connected with colleagues within their virtual professional communities. The latter was mostly achieved as a result of prior face-to-face meetings.

4.3.4 Summary

Overall, the structural equation modelling of the quantitative data as well as thematic analysis of the qualitative data supported the proposed hypothesis, identified within the conceptual framework of the present study. At the same time, several diagnostic values, coupled with additional theoretical propositions, suggested one improvement to the conceptual model, particularly the indirect effect of knowledge sharing self-efficacy on knowledge sharing and receiving. As a result, the final model in the present study suggested that while the need for professional connectedness could be considered to be partial explanation of knowledge receiving within virtual professional communities, knowledge sharing within such communities was associated with both the need for professional connectedness and knowledge sharing self-efficacy.

While the structural equation model in the study supported the proposed associations in the conceptual framework, the descriptive analysis of the quantitative data and thematic analysis of the qualitative data provided insights of identified contextual factors identified within this conceptual framework. In particular, the analysis used in this study suggested that a high proportion of the research participants felt the need for professional connectedness in social media space. The thematic analysis of the qualitative data also suggested the following trends and patterns within framework identified concepts:

- The need for professional connectedness in a social media space could have been partially related to teachers' need for mentoring support, changes in the education system and the school context, particularly, but not limited to, the context of rural schools.
- Knowledge sharing self-efficacy in virtual professional communities could be related to teachers comparing themselves with other professionals, particularly those whom they considered more qualified, experienced or knowledgeable, as well as the affective state within the groups, particularly, the sense of professional connectedness with particular colleagues. It was suggested that the latter was associated with the level of relationships, as respondents reported their confidence about sharing knowledge with colleagues whom they had previously met in real life.

4.4 Summary of the overall findings

This section presents a summary of all the findings presented as a result of addressing the research questions in the present study. Since the aim of the summary is to provide a framework for discussion, this section summarizes the findings with regard to the conceptual framework of the present research. Therefore, the section is divided into four sub-sections, as follows:

- Virtual professional networks and communities;
- The need for professional connectedness;
- Knowledge sharing and receiving;
- The role of knowledge sharing self-efficacy.

Virtual professional networks and communities of teachers

The findings the present study suggest that membership of virtual professional community was a widespread phenomenon among teacher respondents, as the majority of teachers (89.3 %) were members of such. There is also an age factor with most of the non-users of social media networks being over 50 years old. While teachers used various platforms, at the time of data collection, WhatsApp was the most widely used messenger platform for virtual professional communities among teachers.

The analysis of the responses related to teachers' membership of the virtual professional communities suggested an association with the teaching subject, organizational structure and processes of the schools, the central school governance system, the courses within the in-service teacher training system addressing the latest initiatives of the country, such as the multi-level programme and the updated curriculum.

Stressing the overlapping and interchanged nature of teachers' membership of virtual professional communities, the thematic analysis of the study suggested that respondents' membership was mainly represented by two types of professional community, namely 'common place of work' and 'common course or seminar', that were initiated by the LEA and in-service teacher training organization or by teachers themselves.

The thematic analysis of the membership of virtual professional communities demonstrated that social media served as an instrument for professional networking, connecting teachers at the school, district, regional and country levels. However, an emerging pattern relating to the membership of the majority of the respondents suggested that social media platforms were mainly used by respondents in order to support existing relationships and that teaching subject was the most commonly mentioned description of virtual professional communities of which teachers were members.

The need for professional connectedness

The descriptive analysis and structural equation modelling of the quantitative data as well as thematic analysis of the qualitative data supported the proposed hypothesis within the conceptual framework of the study, suggesting knowledge sharing in virtual professional communities was partially associated with the need for professional connectedness.

The descriptive analysis of the quantitative data and thematic analysis of the qualitative data suggested that a high proportion of the research participants felt the need for professional connectedness in a social media space. The thematic analysis of the qualitative data suggested the need for professional connectedness in a social media space could partially be related to teachers' need for mentoring support, changes in the education system and the context of isolated rural schools.

Knowledge sharing and receiving

The findings from both quantitative and qualitative analysis suggested that the most commonly shared type of knowledge within the virtual professional communities of teachers consisted of news, information, opinions, experience and resources in related to teaching practice and school organizational processes.

The study differentiated knowledge sharing into dialogic and disseminative, with dialogic (or collaborative) knowledge sharing referring to asking and responding practice, while disseminative knowledge sharing involved circulation of knowledge. This suggested that although virtual professional communities of teachers could involve both dialogic and disseminative knowledge sharing, the majority of teachers reported exercising dialogic knowledge sharing.

Conceptualizing knowledge sharing in virtual professional communities as teachers' asking and responding practice (collaborative or dialogic knowledge sharing), findings from both qualitative and quantitative data suggested that high proportion of teachers' time spent on participation in virtual professional communities was devoted to knowledge receiving rather than knowledge sharing. On the one hand, teachers shared knowledge within their virtual professional communities because of the opportunity to save time but, on the other hand, time was pointed out as one of the forces that hindered dialogic knowledge sharing.

The role of knowledge sharing self-efficacy

The descriptive analysis and structural equation modelling of the quantitative data as well as thematic analysis of the qualitative data supported the proposed hypothesis within the

theoretical framework of the study, suggesting that knowledge sharing in the virtual professional communities was partially associated with knowledge sharing self-efficacy.

The thematic analysis of qualitative data suggested that knowledge sharing self-efficacy was related to teachers comparing themselves with others, particularly those whom they considered more qualified, experienced or knowledgeable. It could also have been related to the affective state of teachers in virtual professional communities, particularly the sense of professional connectedness with colleagues. The thematic analysis of qualitative data also suggested that the sense of professional connectedness was associated with the level of relationship, as respondents reported confidence about sharing knowledge in virtual professional communities, the members of which were colleagues whom they had previously met in real life.

Therefore, this section summarizes the findings of this research and the discussion of the findings will be provided in the next chapter and possible contributions, implications and future research will be considered.

CHAPTER 5. DISCUSSION

Chapter 5 will discuss the findings within existing literature and will focus on new contributions to understanding and will include implications for practice and point to areas of future research. The discussion is structured within the conceptual framework of this study, and therefore will be structured in the following way:

5.1 Virtual professional communities of teachers

5.2 The need for professional connectedness in virtual professional communities

5.3 Knowledge sharing and receiving in virtual professional communities

5.4 Knowledge sharing self-efficacy in virtual professional communities

5.5 Moderators in virtual professional communities

5.1 Virtual professional communities of teachers

Part 5.1.1 will discuss the findings relating to the use of social media for professional communities and the second part will discuss the findings concerning the membership within virtual professional communities (5.1.2).

5.1.1 Participation

Virtual professional networking is a widespread phenomenon among respondents, as the majority of the questionnaire respondents (89.3 %) were members of virtual professional communities. This may be accounted for through the exponential growth of social media platforms alongside the overall rise of digital platforms. Van Dijck et al. (2018) writing in 2018 termed this the rise of a "platform society", suggesting that "platforms penetrated the heart of societies – affecting institutions, economic transactions, and social and cultural practices" (p.2). The results of the study situated in Kazakhstan are in line with those reported in the global body of literature pointing to the ubiquitous use of social media by various professionals, including doctors and academics (Britton, Jackson &Wade, 2019; Carrigan, 2019; Thomas, 2018; Udawatta et al., 2019) as well as school teachers (Fox & Bird, 2017; Kelly & Antonio, 2016; Ranieri at al., 2012; Robson, 2018; Van Bommel, Randahl, Liljekvist, & Ruthven, 2020).

Teachers' have access to a range of platforms for virtual professional communities. The findings suggest that, although teachers could have used various platforms for personal and professional use, virtual professional communities in the WhatsApp platform was the most popular among the respondents. The adoption of WhatsApp was documented, for example as one of the most popular communication tools among hospital clinicians in the UK (Thomas, 2018); it was the most commonly used tool for supporting nurse graduates' transition into the professional world in the context of South Africa (Pimmer et al., 2019); it was frequently used as a communication tool for teachers in rural India (Nedungadi, Mulki & Raman, 2018). Finally, it was a widely used tool among university students when "sharing academic information, communicating with fellow students and lecturers, and conducting collaborative learning activities" (Nyasulu & Dominic Chawinga, 2019, p. 413).

This study has gone further and, explored how WhatsApp is being adopted within Kazakhstani virtual professional communities of teachers. WhatsApp is easily accessible on smartphones which are used throughout the country. Like other messenger platforms, it is easy to use and provides an opportunity to discuss issues in a closed group, but unlike other social media platforms it does not require the users to have a profile within social networking sites: '*Well, I prefer WhatsApp, it is easier there'* (D2_village3_1T); '*Some teachers don't have a profile in Facebook or Vkontakte, but everyone has a mobile phone'* (D1_village7_1T).

One the other hand, the use of WhatsApp messenger by the research participants of this study could partially be explained by the form of sociality under investigation, particularly online exchange of knowledge. Lantz-Andersson et al. (2018), suggest that instant messaging applications allow exchange of experience and situations, while asynchronous applications support "less immediate and less interactive forms of reflection" (p. 307). Furthermore, the ubiquitous use of WhatsApp messenger could also be explained by the available technical conditions, such as the Internet coverage (D1_village4_1T; D2_village4_1T). In other words, teachers may use WhatsApp messenger due to the speed and coverage of the Internet and 4G coverage, as there are still areas which do not have access to a high-speed Internet and this is still a problem in rural areas, which is scheduled to be solved (Khabar 24, 2019).

Finally, the choice of the platform reflects the domination by five high-tech companies (Alphabet-Google, Facebook, Apple, Amazon, and Microsoft) "assemblage of networked platforms" (Van Dijck et al., 2018, p. 12). Considering market, state and civil society as actors of the "platform society", Van Dijck et al., (2018) suggest that "a connective world requires a profound rethinking of the worlds online ecosystem along with the political and legal infrastructure through which they acquire legitimacy" (p.163).

Overall, the results of the study contributed to the growing body of literature discussing the proliferation of social media platforms for professional networking. In this regard, similar to the argument related to academia (Carrigan, 2019), it could be stated that since social media platforms are increasingly becoming part of teachers' professional networking in Kazakhstan, it is becoming more and more important to consider

opportunities and challenges associated with this phenomenon. Moreover, the penetration of social media in the professional life of teachers, which is supported by the present study, brings into focus the importance of understanding the contextual trends associated with this phenomenon in order to mitigate the challenges and enhance its potential within a particular context. To this end, although this study is limited in its scope and conceptual framework, it could be considered to be a first attempts at understand the contextual trends in the use of social media for professional networking by some of the schoolteachers in Kazakhstan.

Participation in virtual professional communities and age

Although the proportion of those who were not members of virtual professional communities was 10.7 per cent, the findings show that the use of social media is less common among older teachers. In a sense, the findings regarding teachers' use of social media within professional communities reflect research findings outside the field of education. Considering social media within healthcare, Udawatta et al. (2019) reiterate that these platforms could be used to increase professional networking and enhance public health programmes, regardless of geographic and time-related access obstacles. The results of their study suggest that "younger neurosurgeons in training were more likely to read journal articles found via social media and were more likely to believe social media could be beneficial than older neurosurgeons at later stages in their career" (p. 97). Equally, the study conducted by Nord, Espinosa, Paliszkiewicz, and Mądra-Sawicka (2018), examining the usage of social technologies by working women in Spain, reports that women aged between 36-45 years used social media platforms for business purposes more than the next highest age group (46 +).

Considering age as a possible barrier, the existing literature suggests the use of the term '*digital immigrants*' to describe such people. Prensky (2012, p. 69) argues that those people who were born before the digital world but have adopted technology in various sphere of their lives "are, and always will be, compared to them [digital natives]". However, in the process of deconstructing the term '*digital natives*', Palfrey and Gasser (2011, p.188) identify '*digital natives'* as "a population, and not generation, of young people who use technology in a relatively advanced way". To be classified as '*digital natives*', it is suggested that a person should, firstly, be born after 1980, secondly, have

access to digital technologies, and finally, skilful in terms of using digital technologies in relatively advanced ways. Palfrey and Gasser (2011) agree that older people in general use technology less effectively and are less open-mined regarding technology in comparison with digital natives, but they do not agree with labelling adults as 'digital Immigrants'. "Without generational essentialism of employing digital natives and digital immigrants as exhaustive categories, we observe that there is no gap between generations but rather gradients of different usage patterns" (Palfrey & Gasser, 2011, p. 190).

In this regard, in line with consideration of the difference in usage patterns of digital technologies within the population in general rather than different generations, the terms '*early and late adopters*' are now widely used within the research literature. Such a description goes back to Roger's (2003) popular conceptualization of innovation adoption behaviour – the theory of the diffusion of innovations. "An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 2003, p. 12), and "*Diffusion* is the process by which an innovation is communicated through certain channels over time among members of social systems" (Rogers, 2003, p. 11). Social media could be considered as an innovation for potential adopters, and therefore in accordance with this theory, adopters could be differentiated into five categories in accordance with the time used for adaptation, namely: '*innovators', 'early adopters', 'early majority', 'late majority' and 'laggards'*. To this end, summarising existing research findings that relate to variables associated with innovativeness, he suggests some generalizations about *'early adopters'* when comparing them with the rest in regard to their socioeconomic status, personality values and communication behaviours.

Such questions as to why and how people adopt digital technology as one of the innovations is another possible avenue of research. Without being limited to, an example would be the technology acceptance model (Davis, 1989), which discusses two factors, namely, perceived usefulness and perceived ease of use. Equally, Donnelly and Boniface (2013) argue that within the process of teachers' digital capacity building, it is not enough to provide additional time for training but it is also necessary to address teachers' mind set. They found there were teachers in their study who considered that it was easier to avoid technology then investing their time in learning how to use it.

Therefore, reflecting on the findings of this study, it could be inferred that around 11 per cent of teachers were *'laggards'* when it came to the process of adopting social media for professional communities, due to either their socioeconomic status and/or personal values and/or communication behaviour as well as technical conditions where they lived and worked. At the same time, this 11 per cent of people who were *'laggards'* in relation to the process of adopting social media for professional communities might not necessarily have been *'laggards'* when it came to using social media for personal networking, to this end, considering the age as a potential obstacle for participation in virtual professional communities, teacher' commitment for professional learning could be potential partial explanation for it. The findings of a four-year, large-scale, mixed-methods research project (Day & Gu, 2007) concluded that teachers' ability and attitudes to professional learning are associated with their sense of commitment, which in its turn is mediated by their positive professional identity and phases in their professional lives. The research demonstrates that the commitment of teachers in the final phase of their professional lives is more likely to decline, and therefore "in-school support had a significant role to play in helping promote their sense of resilience, agency and well-being and sustain their commitment and effectiveness" (Day & Gu p.438).

> To ignore the specific commitment and resilience needs of veteran teachers is to fail to realize the long-term investment that they and their employers have made to teaching. It is this group which – at least in theory – should be at their peak of their expertise and teaching wisdom. It is this group which should be proving a model for their less-experienced colleagues. Rather than fighting off difficult challenges unaided, they should be beacons of hope and optimism for all (Day, 2017, p. 60).

Therefore, considering the decline in teachers' participation in virtual professional communities with the increase in age, it could be inferred that it is also associated with a decrease in teachers' commitment to professional learning, mediated by professional identity and professional life phases. This could imply that, regardless of teachers' digital capability, sustaining commitment throughout all professional life phases could be one of

the most important strategies for promoting knowledge sharing within virtual professional communities. Moreover, understanding the importance of the expertise of experienced teachers, it could be argued that within a social media space this could benefit more young teachers. Hence, support required to promote teachers' resilience, agency and well-being as well as sustaining their commitment in the later stages of their careers, should be regarded as of a paramount importance and be provided within and beyond the school.

Overall, the discussion of the study findings (section 5.1.1) leads to the inference that social media platforms are increasingly becoming part of teachers' professional communities in Kazakhstan, and the variation in the use of social media for professional communities in accordance with age of teachers suggests that around 11 per cent of teachers are *'laggards'* in relation to the process of adopting social media for professional networking, due to either their socioeconomic status and/or personal values and/or communication behaviour as well as technical conditions within the place where they live and work. Equally, teachers' participation in virtual professional communities could potentially be associated with a decrease in teachers' commitment to professional learning.

5.1.2 Membership

This section aims to present a discussion of the findings related to membership of virtual professional communities, and to do so, the section will be divided into four sub-sections.

5.1.2.1 Formal and informal

Overall the findings suggest that teachers' virtual professional networks in the research context consisted of professional communities within a social media space, that had been initiated by teachers themselves or organized by different stakeholders in the education system, particularly by local educational authorities and in-service teacher training organizations. In this regard, in the literature review of empirical studies of online teacher communities conducted over almost a 20-year period, Lantz-Andersson et al. (2018, p.304) argue that there is an absence of a well-established form of "online teacher community", because online communities of teachers arise as a result of a variety of "technical, social, cultural, economic and political factors that shape contemporary teaching" and "issues of technical configurations of online platforms, differences in

teacher status and demographics, teacher labour and so on". As such, the authors identify formally organized and informally developed online teacher communities based on the origins of the groups using the following definitions:

> 'formally-organized' online teacher communities as top-down professional development endeavours, initiated by schools, districts and government agencies or, as is often the case related to digital technologies private companies. These are also often organized with predefined content and goals. In contrast, 'informally developed' online teacher communities are bottom-up initiatives involving a group of practitioners who choose to come together to discuss, share information and work together (Lantz-Andersson et al., 2018, p. 304).

In a sense, considering the above differentiation of the groups within a social media space, initiation of the groups within teachers' virtual professional networks, identified in this study could be classified as formally and informally organized, as some of them were initiated by schools, district or regional educational authorities or in-service teacher training organizations and, other groups were initiated by teachers themselves.

At the same time, even formally originated groups were not necessarily organized with a predefined content: '*I mostly write here SMU because there are a lot of questions that I don't agree with. Sometimes I write what I agree with, sometimes what I disagree with'* (D1_village3_1T); '*Well, yes, in this group, we have an administrator, our head of District Methodological Unit, she created this group and adding the necessary people. So, at the beginning of school year we were solving issues related to the updated curriculum'*. Consequently, these formally organized groups could also be considered as an informal means of communication, and, consequently, an exchange of knowledge within both types of virtual professional community could cause them to be regarded as places for informal learning (De Laat, 2012). Therefore, reflecting on the conceptual framework of this study (chapter 2), it could be inferred that the opportunity for informal professional learning in the research context could be associated with both formal and informal virtual professional communities of teachers.

5.1.2.2 Common course and place of work

Although some respondents reported membership of virtual professional communities at regional and country level, not all of whose members they knew, the majority of respondents reported membership of virtual professional communities, characterized by two types, namely, common course (different districts and/or regions) or common place of work (school, district, region, country). In this regard, one of the ways to understand such professional community membership could be an application of the theory of social identity.

McMillan and Chavis (1986) argue that sense of community can be equally applied to both territorial and relational (professional) communities, and define it as "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and shared faith that members' needs will be met through their commitment to be together" (p. 9). Their definition has four elements: the first element is related to the membership, which is "the feeling of belonging or of sharing a sense of personal relatedness"; the second element relates to an individual's sense of influence, a "sense of mattering, of making a difference to the group and of the group mattering to its members" later described as trust (McMillan, 1996); the third element is related to fulfilment of members' needs as a result of access to resources through group membership; and the last element related to "shared emotional connection, the commitment and belief that members have shared and will share *history, common places, time together*, and similar experiences" (McMillan & Chavis, 1986, p. 9). Therefore, reflecting on the theory of social identity, it could be inferred that teachers initiate virtual professional communities within their virtual professional communities because of a common history (common course) and common place of work and they interact within such groups if these groups are characterized by relationships of trust and under conditions in which teachers' needs within these groups are satisfied.

Common course

The findings of the present research suggest that the majority of respondents had virtual connections with teachers from different districts of the region because of their membership of virtual professional communities united by participation in a common course. This finding reflects those of the '*Impact study of the Centre of Excellence*

programme in Kazakhstan' (Wilson et al., 2016), which identified the existence of active networks of trained teachers working together, involving educators from the in-service teacher training system.

Firstly, it could be inferred, that along with various possibilities for creating virtual professional communities, common course might have been one of the driving forces for teachers from different districts to get to know each other, to form virtual professional communities and consequently have access to external social capital as a result of bridging relationships. Although not every course or seminar managed or aimed to develop a shared identity and sense of connectedness enabling members of a common course virtual professional communities to develop bonding relations, it could be argued that a common course could be considered to be an opportunity for teachers from different schools to meet each other and establish bridging relationships face-to-face. It is suggested that this in turn could be a prerequisite for trust in virtual communities (Matzat, 2010; Tseng & Kuo, 2014). Hence, it could be argued that bringing teachers' social capital and social media to the attention of in-service teacher training organizations, particularly in the context of Kazakhstan, would be one of the ways to promote educators' social capital.

Secondly, it could be argued that social capital built as a result of attending a common course in the context of educational change is one of the necessary conditions for successful educational change. It was described by respondents as one of the places where teachers could make sense of the countrywide education reform: '*this is the group from the updated curriculum course, that I took last year in May…in this group, we find answers only to our questions relating to the updated curriculum. It is helpful. I and others, we all share our thoughts there… I ask and always find answers to my questions'* (D1_town_1T).

Finally, some teachers pointed out that the content of follow-up discussion in virtual professional communities united by having attended a common course was related to the course topic: *'We all together took a course, everything was OK, but when you come home you happen to forget some things and then we start asking questions'* (D2_village2_1T). It could be inferred that, membership of the virtual professional

communities united by a common course would be a space for rapid and cost-effective post-course support and informal learning. Therefore, it could be suggested that connecting social media with face-to-face in-service training could enhance the learning outcomes of teacher training courses.

Common place of work

Simultaneously, the findings reveal that group membership of virtual professional communities could have an interchangeable nature. This means that virtual professional communities can be created as a result of teachers being introduced to each other during the course and who then continue to be connected not only because they participated in the same course together, but also because they were working at the same district or the same region. At the same time, teachers often take part in seminars or training courses, organized for teachers within their districts and region. Moreover, the findings also suggest ubiquitous use of social media within the school, district and region virtual professional communities, initiated not only by teachers as the result of participating in a common course or seminar, but also by teachers, the school leadership team and LEA as a result of being united by a common place of work.

Therefore, it could be suggested that a common place of work is another emerging common agenda for relationships within virtual professional communities. It could be argued that as well as common courses or seminars providing an opportunity for bridging relationships and establishment of trust, common place of work (school, district, region) could also be considered as a form of social glue that could support teacher's communication in virtual professional communities. Hence, bringing social media to the attention of the school as well as district and regional educational authorities was one of the ways to promote educators' social capital.

On the one hand, it could be inferred that the use of social media within a common place of work (school, district or region) helps to ensure a rapid knowledge exchange: *'sometimes our head of school methodological unit shares in our common task, so when it is urgent, we discuss it there or if it is not urgent, then we discuss the best time for us to meet for a discussion'* (D1_town_1T), particularly in the context of educational change: *'In this group, we have a administrator, our head of District Methodological*

Unit, she created this group and adding the necessary people. So, at the beginning of school year we were solving issues related to the updated curriculum' (D1_village10_1T).

On the other hand, it could be inferred that promoting social capital within such groups is another instrument for facilitating sustainable informal professional learning of teachers. While groups initiated by teachers themselves had their own active teachers who initiated the discussions, the groups initiated by the formal leaders within such groups could be considered leaders of the learning. In this regard, Fancera (2019, p. 2) argues that using the potential of social media to prune the expenses and time required for traditional forms of professional development, school leaders can "create more collaborative and personalized" opportunities for teachers' learning. The findings from the semi-structured interviews of six school leaders in the United States suggest that social media and networking could be used to personalize teachers' professional development, and to engage teachers in this process, there is a need for leadership in order to model and encourage (Fancera, 2019). Although teachers have various opportunities for professional development, school leaders who were interviewed pointed to the insufficiency of opportunities provided "to address individual professional growth needs" and considered social media and networking to be a useful instrument for creating such conditions (Fancera, 2019). In this regard, these school leaders were trying to model and encourage participation in various ways including sharing resources from various other platforms or participating in the discussions as well as hosting discussions for teachers to join (Fancera, 2019).

Overall, it could be inferred that the majority of teachers supported the idea of professional relationship helped by the use of social media within and beyond the school, as they were either members of virtual professional communities created as a result of a common course or shared a common place of work, and these virtual professional communities included teachers from the same and different districts and regions. Considering this finding from the point of bridging theories of networks (Burt, 1992; Granovetter, 1978; Lin, 2008), it could be suggested that teachers' affiliation to different kinds of groups beyond their schools, within the social media space, allowed them to increase their social capital and as a result gain an access to additional resources (in the

context of this research - knowledge). In this regard, the existing literature concerned with the relationship beyond the school argues for the building of external ties "as a means of providing a useful sounding board for ideas, source of new perspectives, social support, and resources" (Leana & Pil, 2017, p.120).

5.1.2.3 Teaching subject

Although the analysis of the responses related to teachers' membership of virtual professional communities suggested association with organizational structure and processes of the schools, as well as central school governance system and the courses of the in-service teacher training system in the context of the latest initiatives, one of the main findings is that teaching subject is the most common agenda for membership in virtual professional communities: *'...then I have a school-wide group and our subject [Kazakh language] methodological unit*' (D1_town_1T); '*Admin of our group is our head of district methodological unit. She created the group and is adding who is necessary'* D1_village10_1T); '*here we have teachers from the whole of Kazakhstan, I mean only English language teachers'* (D1_village1_1T).

To this end, with the aim of understanding teachers' social capital development by examining the factors associated with the facilitation of social relations, Spillane et al. (2017) argue that the formation of ties is associated more strongly with "educational infrastructure" rather than personal characteristics, like gender or experience. In particular their quantitative analysis suggests that subject-specific leadership position substantially contributes to the proportion of teachers in schools being asked to provide instructional advice or share information in relation to this subject. In this way, Spillane et al. (2017) argue that school subject should be taken into account by school leaders and policy makers in the process of investing in the social capital of teachers. In doing so, they argue for the need to consider how different parts of the "educational infrastructure for a particular school subject can interact to support the distribution of resources that support instruction and instructional improvement" (Spillane et al., 2017, p. 111).

Considering the present findings with respect to the educational infrastructure provided for a particular subject, it could be inferred that virtual professional communities in the research context which reflect the existing Methodological Units at a school level and

district levels, as well as recent subject-specific courses concerned with updating of the content of secondary education system could be regarded as subject-related infrastructure for the building of social capital of teachers. At the same time, considering educational infrastructure to improve subject teaching at a system level, as well as opportunities for developing external social capital, the lack of comments on subject specific country-wide groups, as well as the absence of comments during the interviews on any subject-specific professional bodies could suggest that country-wide subject-specific organizations (associations) were not active in the social media space. Equally it could suggest the general passiveness of these organizations (associations) when it came to working with teachers. In this regard, it could be argued that active functioning of such professional bodies, including within a social media space, could be a vital source of educators' external social capital (Lin, 2008) and consequently a source and result of new subject-specific knowledge in the process of sustainable instructional improvements.

5.1.2.4 Ethical challenges

Overall, considering the types of virtual professional communities as an opportunity for informal professional learning, we should also be cautious since some of the communities in the research could also generate potentially negative consequences in relation to teachers' well-being. Social media allows informal communication 24/7, which in its turn tempt for school principals and representatives of local educational authorities to use teachers' free time for organizational issues and in a worst-case scenario to demand an immediate reply, particularly in a context in which some representatives of LEA could be "checking up and reporting on whether or not schools are complying with the rules and norms, instead of providing schools with methodological support for improving teaching and learning" (Ayubayeva, 2018, p.116). Equally, the use of social media at the school context could also face the challenge of professional identity with regard to employers as discussed by Carrigan (2019) in relation to the use of social media in academia. In particular, he cautions that "social media is becoming mandated by institutions in a way that might squeeze out the potential scholarly and personal value to be found in its use" (Carrigan 2019, p.158-159).

Pointing to the dilemmas associated with the ubiquitous use of social media by teachers, particularly that related to negotiation of personal-professional identities, peer pressure

and privacy, Fox and Bird (2017) address the need for evidence-based advice for teachers, professional bodies and policy-makers on how to help busy professionals in the context of increasing pressure to use social media for professional purposes with colleague, parents and students.

Considering the border between private and professional use, Thunman and Persson (2018) explore teachers' experiences of ethical dilemmas regarding "(1) teachers' moral responsibility for pupils' actions and (2) how teachers appear on social media" (p.175). As the result of focus group interviews with secondary school teachers in Sweden, Thunman and Persson (2018) suggest four main roles practiced by teachers while managing identified dilemmas. On the one hand, in considering teachers' role as separate from the private self, teachers prefer to separate their social media accounts and do not wish to interfere with pupils. On the other hand, in "emphasizing personal commitment" teachers could be sharing their personal life with pupils in a social media space. In this way, Thunman and Persson (2018) raise ethical questions regarding teachers' role in this new social space. To this end, Carpenter, Kimmons, Short, Clements, & Staples (2019, p.10) argue that "teachers contribute to students' identity development in a variety of ways, and the challenges of digital era suggest that young people could benefit from teachers' serving as a role model of wise, holistic social media user rather than self-limiting, strictly professional use" and "if teachers have guidance and opportunities to reflect upon the implications of sharing and not sharing different aspects of their identities via social media, then some of the context collapse could perhaps be avoided".

In this regard, while policies regarding interactions of teachers with students in social media is attracting attention from scholars, research investigating the policies regarding teachers' use of social media in terms of its potential for professional knowledge exchange and consequently learning is limited (Rodesiler, 2017). With the aim of understanding existing policies regarding teachers' participation in social media space for professional purposes, Rodesiler (2017) found that 19 of the 30 school districts that were studied provided social media policies for teachers, which in their turn varied within regions. Moreover, the study raises the issue that "delineating appropriate uses of social media from those that are disallowed requires nuance" where "ambiguous and contradictory language will not suffice" (Rodesiler, 2017, p. 299). In this way, Rodesiler

(2017) attracts the attention to the fact that it is not quick or easy for teachers to share knowledge with their colleagues in social media as sharing classroom images, examples of students work, or curriculum resources should comply with existing policies and ethical principles. Therefore, by understanding such challenges in the use of social media for professional learning, teacher educators have more opportunities to "to help teachers consider the ways they can share and discuss their practices on the Web as a means of advancing their professional growth and yet do so in an ethical manner" (Rodesiler, 2017, p. 299)

All the above arguments, but not limited to them, bring into the focus ethical challanges in relation to social media use in the context of the teaching profession, particularly in the context of informal learning in virtual professional communities. New ways of working require new rules and support, particularly social media policies and ethical guidelines, in order to overcome the challenges associated with social media and leverage the potential it has. To this end, Rodesiler (2017, p. 299) argues that by "involving teachers in the process, policymakers might define more specifically each type of use and ensure that policies are free of contradictory statements that send mixed messages".

To sum up, discussion of the membership of virtual professional communities (section 5.1.2) are leading to the argument that the majority of teachers were in favour of developing professional relationships with the help of social media within and beyond the school, and their virtual professional networks mainly consisted of groups initiated by teachers themselves or organized by different stakeholders in the education system (formal and informal). They welcomed opportunities for informal professional learning within both formal and informal virtual professional communities of teachers.

The analysis suggests that two types of virtual professional communities, namely, common course (different districts and/or regions) and common place of work (school, district, region, country) could be considered as drivers of professional relationships within a social media space, as they could promote rapid and cost-effective exchange of knowledge, particularly in the context of educational change, as well as providing opportunities for enhancing the learning outcomes within teacher training courses. This

would demonstrate that membership of such virtual professional communities provides opportunities for informal professional learning.

At the same time, teaching subject was found to be one of the most common factors associated with virtual professional relationships, and findings of this study relating the framework of educational infrastructure of a particular subject, suggest that existing Methodological Units at school and district levels, as well as recent subject-specific courses within the framework of updating the content of the secondary education system, could be regarded as subject-related forms of infrastructure for building the social capital of teachers in virtual professional communities. Equally, discussion in relation to the findings of this study indicates that a stronger presence of subject-specific professional bodies in social media space could increase the opportunities for building the social capital of educators, including the provision of the access to 'external social capital' (Lin, 2008). In this way a source for, and result of, new subject-specific knowledge within the process of sustainable instructional improvement could be developed.

Finally, the discussion of the present findings suggests that a further line of inquiry could be guided by questions relating to the formal structures and systems necessary for and available within, the process of building and sustaining such virtual professional communities as well ethical challenges within informal learning in virtual professional communities, particularly in the research context.

5.2 The need for professional connectedness in virtual professional communities

The findings that emerged from both qualitative and quantitative data analysis suggest that the need for professional connectedness is partially associated with teachers' knowledge sharing and receiving in virtual professional communities, being conceptualised as a required element of a triangular relationship for informal learning in such communities (Chapter 2, section 2.4). Therefore, this study confirms findings reported in the existing literature, which suggest that teachers' engagement in virtual professional communities reduces professional isolation (Cho, 2016; Hur & Brush, 2009; Wesely, 2013; Yildirim, 2019).

The findings of this study, as the result of both qualitative and quantitative data analysis, confirm the hypothesis within identified conceptual framework (Chapter 2), particularly in relation to the need for professional connectedness as part of professional identity and commitment for learning. Teachers' responses to the question related to the reasons of using social media for professional networking, were associated with the need for professional connectedness as part the need for constant learning and professional community membership: *'Well, you are always up-to-date, always aware of the latest changes, you know how other people work'* (D1_town_4T); *'Very useful for me as I try to learn something that I didn't know'* (D1_village13_1T); *'First of all, an opportunity for discussions'* (D1_village13_1T); *'A lot of opportunities, for example, exchange of opinions with colleagues around the country, for example, I have colleagues in cities like XXX and XXX, but with the help of virtual networks, we are communicating'* (D2_town_1T).

At the same time, the findings of the present study illustrate that teachers' knowledge sharing pattern in virtual professional communities was different from knowledge receiving (Chapter 4 section 4.2.3). In this regard, it could be suggested that the findings of the present study are in line with the argument of Robson (2018, p. 439) in relation to the need for "reconceptualisation of professional identity for the digital age". Highlighting "complex, messy social realities of online social spaces and online engagement", Robson (2018, p. 441) put forward a conceptual model of professional identity that originated in the digital age. In particular, the model suggests conceptualising professional identity in "both performative and constructive terms" with respect to active and passive forms of participation, unlike interchangeable use of these terms by scholars when discussing the professional identity of teachers. In this way, although suggesting the separation of performance and construction, the proposed conceptualization "hold[s] together both agentic and structured ways of interacting in complex social spaces" by means of the concept of "embedded ideal identity".

> Embedded ideal identity is both the mechanism of construction (structure), normalizing behaviour and shaping professional identity (Foucault, 1975) and the manifestation of performance (agency). Through agentic performances and reinterpretations (Butler, 1990)

> of ideals teachers can shape the structured context in which they engage (Robson, 2018, p.447).

Therefore, the present findings and discussions lead to the suggestion that in order to promote informal learning within virtual professional communities, there is a need to consider ways of promoting teachers' need for professional connectedness as part of "ideal professional identity" and commitment for learning; in other words this refers to the necessary conditions within and beyond the schools, as well as at national level, that facilitate or inhibit teachers' need for professional connectedness as part of their professional identity and commitment for learning. Likewise taking into account discussion related to variation within participation in virtual professional communities in accordance with the age of teachers (section 5.1.1) the suggestion could also be related to the conditions required for teachers' resilience, agency and well-being as well as their ability to sustain commitment in the later phases of their professional life in order to be able to harness the potential of experienced teachers.

Having examined the ways in which the need for professional connectedness associated with knowledge sharing and receiving in virtual professional communities, the results of thematic analysis of the interviews in this study suggest that some of the contextual drivers associated with the need for professional connectedness could be partially related to the need for mentoring support, educational change and working conditions in rural schools.

5.2.1 Mentoring

The thematic analysis of the interview transcripts suggested that novice teachers' need for professional connectedness within virtual professional communities could partially be related to the need for mentoring support. This finding is consistent with Risser's (2013) study related to a longitudinal (nine-month) exploration of one beginning teacher's informal mentoring network on Twitter, which demonstrated that the beginning teachers' network was mainly used for information seeking. In this regard, Risser (2013) suggests that beginning teachers are less experienced and therefore might be less confident about replying to others' queries, as well requiring more learning and information and having greater resource needs.

On the one hand, the emerging finding of this study relating to the active use of social media for professional networking among beginning teachers could suggest that these teachers are objectively isolated in their schools due to the fact that the majority of respondents were teaching in rural school and might have been the only teachers of the particular subject in their schools. Therefore, despite being assigned to a mentor, novice teachers in rural schools could still be in need of subject-specific knowledge.

On the other hand, regardless of the school location, it could be a sign of insufficient mentoring support provided in their own schools, which is reflected in the results of the TALIS 2018, according to which 59 per cent of novice teachers in Kazakhstan had an assigned mentor. At the same time, the findings of this study as well as the results of TALIS 2018, could imply that even in cases when novice teachers are assigned a mentor within their school as described by National Report (2018), it could imply that the mentoring process does not satisfying the needs of the novice teachers or equally that it is not performed by experienced teachers. The latter issue has been partially addressed recently in the adoption of the Law on Teacher Status on the 27 December 2019, which stipulates a payment for teachers appointed to be mentors for novice teachers.

Equally, the need for mentoring support could suggest an existing twofold gap between pre-service teacher training and teaching practice in schools. On the one hand, the gap could be associated with the challenge pointed out within the study on "recruitment into teaching, teacher development, and teacher salaries" in some of the Commonwealth of Independent States, that "pre-service teacher education is highly criticized by many for its general orientation and low regard for pedagogical knowledge and teaching practice" (The United Nations International Children's Emergency Fund (UNICEF), 2011, p.66). On the other hand, "the growing gap between the desired innovation and the preparation and support of teachers" (Sagintayeva et. al., 2014, p. 43). One of the example for innovation gap is highlighted by Yakavets, Bridges and Shamatov (2017, p. 612) when discussing the differences in "understanding, the constructs and construction of teachers' professional knowledge" between the established understanding of the pedagogic institutes and those currently promoted in Kazakhstan in line with international experience. In particular the differences are not only related to the "forms of pedagogy"

but also to the teachers' beliefs, teaching culture and understanding of teacher professionalism.

Likewise, when considering this finding from the social capital perspective, it could be the case beginning teachers have an opportunity for an access to external social capital (Lin, 2008) as the result of bridging relationships with the of social media. This argument, regarding the social capital of beginning teachers is consistent with recent views on mentoring. While formaly mentoring programmes usually suggest that a beginner teacher should be assigned to the more experienced teacher, current research in this field suggests that novice teachers receive support from social connectedness through networking within and beyond the schools (Baker-Doyle, 2012; Fox & Wilson, 2009; Fox & Wilson, 2015; Le Cornu, 2013; Struyve et al., 2016).

The research shows that relationships with other educators foster beginning teachers' sense of belonging to the profession (Fox & Wilson, 2015; Le Cornu, 2013) and are associated with a reduction in their desire to leave the profession, through the mediation of attitudes to the job, as social connection with other educators contributes to the satisfaction and commitment (Struyve et al., 2016, p. 212). In this regard, along with the understanding of the need for a supportive culture of relationship of trust, Fox and Wilson (2015) suggest that beginning teachers should be proactive in obtaining support for their professional development through networking, being aware that their behaviour and attitudes are associated with the resources they access. Hence beginning teachers are recommended to make good use of available opportunities when meeting or observing colleagues, including asking them questions.

In this way, the pattern identified in the findings of this study, provides an example of the proactive behaviour of beginning teachers in terms of obtaining professional support, and provides empirical evidence of social media acting as an instrument of this process. Hence, taking into account the fact that beginning teachers ask questions of people beyond their schools who are in their virtual professional communities, it could be suggested that social media is a useful instrument for beginning teachers to access social capital, and, hence, should be considered as one of the opportunities for providing mentoring support.

Therefore, this discussion of the findings relating to the mentoring support available within virtual professional communities leads to the inference that one of the external factors associated with the need for professional connectedness within social media is related to the need for beginning teachers to receive mentoring support. This is particularly in the context of rural schools where such support could be a deficit due to the limited number of teachers teaching the same subject and the gap between pre-service teacher training and teaching practice in schools. Equally, the need for professional connectedness could be associated with the proactive practice of the beginning teachers within both rural and urban schools to access an external social capital.

In this way, the findings of this study suggest that virtual professional communities could serve as an instrument for the provision of mentoring support for beginning teachers, particularly in rural schools, and thus partially address the existing challenges of mentoring. Although colleagues in other schools could be a vital source of such support, I believe that such an instrument could be a useful way of organizing and providing mentoring support from pre-service and in-service teacher training educators as well the LEA.

5.2.2 Educational change

The thematic analysis of the interview transcripts suggested that teachers' need for professional connectedness in virtual professional communities could partially be related to the educational changes. The thematic analysis of the interviews suggested that quite a substantial part of knowledge (opinions, resources and experience) in virtual professional communities was related to educational change.

On the one hand, it could be suggested that teachers valued the benefit of working together, preferring exchange of knowledge in order to have informed professional judgements (Veugelers & O'Hair, 2005), and that is why, in order to overcome the constraints of time and distance, they had become members of virtual professional communities and the content related to the educational change was the reflection of their current interest.

On the other hand, it could be suggested that, as well as the constraints of time and distance, teachers were using social media in order to overcome the uncertainty within the process of educational change. According to Baumeister and Leary (1995, p.497) the need to belong is a fundamental human motivation and "can provide a point of departure for understanding and integrating a great deal of existing literature regarding human interpersonal behaviour". As a result of the review of accumulated evidence, Baumeister and Leary (1995, p. 522) concluded with the broad hypothesis that "human beings are fundamentally and pervasively motivated by a need to belong, that is, by a strong desire to form and maintain enduring interpersonal attachments".

Baumeister and Leary (1995) argue that such fundamental human need developed as the result of natural selection of human species. In order to survive people depended heavily on others and individuals who formed close relationship with others were more likely to survive and reproduce, hence, through the process of natural selection the need to belong became common for human beings. Therefore, by making multiple links between the need to belong and cognitive processes, emotional patterns and behavioural responses, they argue that the desire for interpersonal attachment forms one of the concepts that fosters understanding human nature.

Summarising the empirical literature on social and personal psychology, Baumeister and Leary (1995, p. 502) conclude that

> people seem widely and strongly inclined to form social relationships quite easily in the absence of any special set of eliciting circumstances or ulterior motives…Not only do relationships emerge quite naturally, but people invest a great deal of time and effort in fostering supportive relationships with others. External threat seems to increase the tendency to form strong bonds.

In this regard, applying human motivation to belong (Baumeister & Leary, 1995) in the context of educational change, the formation of strong bonds could be the result of teachers feeling external threat and uncertainty.

Equally, in relation to the argument that teachers may want to overcome the uncertainty within the process of educational change, creating and sustaining relationships within virtual professional communities could also be explained by theories of modern economics, in which one of the assumptions regarding human nature, summarised by Fukuyama (2018, p.13), is that when "people cooperate with one another, it is because they calculate that cooperation will serve their individual self-interest better than if they act on their own". Therefore, the need to be connected in the context of educational change could be associated with teachers' desire to cooperate with each other as a result of their understanding that in this way they will benefit more than they would working on their own.

Along with such explanation, although the findings of this study could imply teachers' commitment to professional learning in the context of educational change or responding to these changes, it could also imply the need for additional support and dialogue between all stakeholders within the current educational reform movement.

At the same time, due to the fact that some groups were initiated by representatives of the LEA and in-service teacher training centres, it could also be inferred that teachers used social media because the stakeholders who were responsible for organization of teachers' work and learning processes identified this form of communication in order to overcome the constraints of time and distance in the process of providing support in the context of educational change.

Therefore, the findings relating to the need for professional connectedness in the context of educational change and the present discussion lead to the suggestion that this research provides empirical evidence of virtual professional communities being used as platforms for rapid and convenient knowledge exchange as part of informal professional learning in the context of educational change within a large school network with a high proportion of teachers working in rural areas. In this way, the present study contributes to the growing body of literature on the social side of educational change by providing empirical evidence for the use of social media in this process.

5.2.3 Rural schools

The thematic analysis of the interview transcripts as well as discussions in the previous sections (5.2.1 and 5.2.2) suggest that teachers' need for professional connectedness in virtual professional communities could partially be explained by professional isolation of teachers in rural schools. They may be objectively isolated due to the fact that they may be the only subject specialist in their schools, coupled with the distance between rural schools, and the distance between rural schools from the district and regional centres due to the large geographical area of the country, and the policy of universal and compulsory access to schooling. Simultaneously, while some teachers reported the need for connection with rural schools from other districts, others reported the benefit of having virtual professional connections with teachers from urban schools.

Although the findings of this study could imply commitment to professional learning of teachers working in rural schools, it could also indicate that these teachers were trying to bridge the existing disparity between rural and urban schools in terms of access to information and resources. In this way, this study is reinforcing the long-standing agenda for secondary school system improvement related to the disparity between rural and urban schools as there is still a gap between urban and rural schools according to national and international assessment systems, as well as allocation of school resources (OECD, 2015; IAC, 2018).

Therefore, although the number of interview participants was limited, taking into consideration that the majority of interview respondents were representatives of rural areas, it could be suggested that teachers in rural areas were using social media platforms to increase their social capital. This consequently made them less isolated from other professionals, particularly from colleagues in urban schools. In this way, this study provides empirical evidence of virtual professional communities being used as platforms for rapid and convenient knowledge exchange as part of informal professional learning within a large school network with a high proportion of teachers working in rural areas.

To sum up, the findings and this discussion of the need for professional connectedness within virtual professional communities (section 5.2) are leading to the argument that promotion of informal learning within virtual professional communities requires

consideration of the ways to promote teachers' need for professional connectedness as part of their professional identity and commitment for learning. In particular, considering the variation in the participation in virtual professional communities in terms of the age of teachers (section 5.1.1) and the need for mentoring support in virtual professional communities (section 5.2.2) the present argument is related to the conditions required for teachers' resilience, agency and well-being as well as the means of sustaining commitment in the late phases of their professional life in order to be able to harness the potential of experienced teachers in the process of mentoring the beginning teachers.

Moreover, as well as confirming that the need for professional connectedness associated with knowledge sharing and receiving within virtual professional communities, this study suggests that part of the contextual drivers associated with the need for professional connectedness could be partially related to the need for mentoring support, educational change and working conditions in rural schools. In this way, by providing empirical evidence, the study suggests that virtual professional communities could be used as platforms for rapid and convenient knowledge exchange as part of informal professional learning within a large school network with a high proportion of teachers working in rural areas, particularly in the context of educational change and the need for mentoring support. To this end, although teachers could become active agents of knowledge exchange within such communities, I believe that such an instrument could be a useful way for pre-service and in-service teacher training educators as well LEA and subject specific associations to organize and provide support and access to external knowledge.

5.3 Knowledge sharing and receiving in virtual professional communities

Considering the findings of this study relate to the concepts of knowledge sharing and receiving within the identified framework (Chapter 2, section 2.4), this section presents a discussion of the findings relating to the nature of knowledge sharing and receiving within virtual professional communities. To do so, the first part of the section presents a discussion of the manifestation of professional knowledge in virtual professional communities, which was found in this study and in this way considers the knowledge receiving patterns (5.3.1); the second part presents a discussion of most common knowledge sharing practice (5.3.2); and, finally, the third part provides a discussion of

the difference in teachers' knowledge sharing pattern in comparison with knowledge receiving within virtual professional communities (5.3.3).

5.3.1 Professional knowledge

Findings arising from the analysis of both qualitative and quantitative data suggest an emergent trend among teachers in Kazakhstan of using social media in professional communities in order to obtain knowledge, which was manifested in an overlapping mix of news, information, opinions, experience and resources. The nature of the knowledge exchanged between teachers within the social media space was, in a sense, in line with that reported in existing studies. Contributing to an understanding of teachers' engagement within social media space, Hu, Torphy, Opperman, Jansen, & Lo (2018) found that social media was used as a source of instructional resources, local and global news in education and the opportunity to take part virtual conversations.

A recent systematic literature review, conducted by Lantz-Andersson et al. (2018), examined 52 empirical studies from the 2000s to the present time and found teachers' practice of sharing within the space of social media provided educators with new ideas and resources. They argue that the nature of knowledge and the way of sharing it differ according the particular technology used, as instant messaging applications allow exchange of experience and situations, while asynchronous applications support "less immediate and less interactive forms of reflection" (2018, p. 307). Therefore, it could be inferred that the use of WhatsApp messenger by the research participants of the present study could partially be explained by their need for and the nature of knowledge sharing and receiving practice.

Therefore, considering the nature of the knowledge (news/information, opinions, experience, resources) within virtual professional communities of the research participants, this study suggests that virtual professional communities could be recognized as one of the spaces for informal professional learning because of the opportunity to acquire public and/or personal knowledge relating to the teaching profession. In a sense, this inference is in line with the findings of a recent study conducted by Van Bommel et al. (2020), who explored six teachers' Facebook groups in Sweden in relation to the teaching of mathematics and Swedish. The study pointed out

"the potential of social media groups for teachers in developing professional knowledge" as, at the transactional level, they established that 86 per cent of discussion threads made professional knowledge available, and 88 per cent and 11 per cent of discussion threads involved acknowledgement of teachers' "opportunities for professional learning" and "new understanding" respectively (Van Bommel et al., 2020, p. 2).

In this way, the findings of this study confirm part of the conceptual model of informal learning in virtual professional communities of teachers (Chapter 2, section 2.4). Therefore, deliberating with the help of Lin's (2001) definition of social capital (Chapter 2, section 2.1.1), it could be argued that this study provides empirical evidences that social media in Kazakhstan is gradually becoming an integral part of the process of building the social capital of educators, as accessed by teachers, knowledge (news/information, opinions, experience, resources) within virtual professional communities could be considered as one of the resources embedded in virtual professional networks of teachers.

At the same time, a further line of inquiry could relate to the questions of whether shared knowledge in interested virtual professional communities is promoting professional learning, and/or dialogue between all stakeholders, particularly in the context of educational change, and what the impediments are. In this regard, in exploring teachers' online synchronous discussions within an in-service professional development programme, Chen et al. (2009, p.1155) found that such discussion was not only a learning tool within the programme, but also a place for exchange of information, socialization and support. They reported that "the teachers posted more social messages in the beginning and the end of discussion, and most messages did not involve any cognitive and metacognitive skills". Similarly, in research on a formal virtual professional group within an online course, Jarosewich et al., (2010, p. 118) reported that most of the discussion prompts did not required reflection on the part of the participants, who in their turn, "seldom challenged peers to higher levels of analysis or reflection".

5.3.2 Dialogic knowledge sharing

The findings suggested that the nature of knowledge sharing within virtual professional communities of teachers could be classified into dialogic and disseminative forms with dialogic knowledge sharing referring to asking and responding, while disseminative

knowledge sharing involves circulation of knowledge. Although some teachers reported that they were agents of disseminative knowledge sharing, the majority described their knowledge sharing as dialogic.

In a sense, the nature of this knowledge sharing could be partially explained by the need for professional connectedness (section 5.2), particularly the need for mentoring support, which assume that interactions would be initiated by someone asking for ideas, help or advice: *'Mostly young teachers, who have just started teaching maths or physics, they always ask something so they could be considered as initiators of group chats'* (D2_village7_1T). Similarly, the need for professional connectedness in the context of rural schools, which was revealed by some teachers from rural schools who reported asking their colleagues: *'we have teachers of different subjects and a lot of deputy heads of schools, who are working in urban schools and they somehow get information quicker than we do. So, when we ask something, we always get an answer'* (D2_village5_1T).

Equally, the context of educational change could provide one of the potential explanations for the prevalence of such knowledge sharing practice. Appreciating the opportunity for follow-up discussion in relation to ideas discussed during the courses in the context of educational change, teachers reported raising follow-up questions within the common course groups: *'For example, look, we all toke one course together, everything was OK, but when you come home you happen to forget some things and then you start asking question'* (D2_village2_1T). At the same time, teachers also described their knowledge sharing practice by asking questions related to the aspects of current educational change within these groups long after the course had finished: '*This is the group from the updated curriculum course, that I took last year in May…in this group, we find answers only to our questions related to the updated curriculum, … I ask and always find answers to my questions'* (D1_town_1T). As for 'common place of work' groups found in this research, teachers also reported asking questions in the process of making sense of educational change: *'In our group we always have a dialogue, we discuss different topics, for example, now we are in the process of updating the content [of secondary education system] … for example, sometimes I need some resources, maybe someone has what I need. So, you ask, and people share'* (D1_village1_1T).

The findings relating to dialogic knowledge sharing of teachers in virtual professional communities were also in line with those of other studies. Exploring how educators were using a PLN (personal/professional learning network) in the educational environment, Davis (2013) explains that teachers used various social media platforms as part of a PLN, and most commonly because it increased teachers' individual knowledge by means of "asking questions and seeking new resources for classroom use" (p. 7). Equally, Tsiotakis and Jimoyiannis (2016) found in their study that many teachers used community platforms to find necessary information and quick answers to their instructional or wider educational questions. A recent digital ethnography, conducted by Robson (2018) also revealed that the major part of teachers' interactions in three online social spaces were about "requesting and giving practical teaching advice, lesson ideas and resources" (p. 444).

5.3.3 Dialogic knowledge sharing and receiving

The finding relating to the present exploration of knowledge sharing in virtual professional communities of teachers suggested that a high proportion of respondents' time when in participating in such communities was devoted to knowledge receiving rather than dialogic knowledge sharing. This finding is in line with the findings of existing research related to the overall social media field and particularly its use among educators. For instance, researching the largest voluntary online community of teachers in Korea, Seo and Han (2013) demonstrated the tendency of a small number of teachers to share their teaching materials, with many preferring only to use and not to contribute.

Equally, in attempting to understand teachers' online engagement in a recent digital ethnography of three online social spaces, Robson (2018, p.443) also observed active and passive forms of engagement:

> Active engagement involved users entering the online social spaces in a way that was publicly visible to others - representing themselves in the space through posts, online social interactions and through the use of space-specific functionality ("liking" on Facebook), all of which left observable artefacts. More passive forms of engagement involved users reading, thinking about and internalising materials

> and information posted by other people. Although distinct activities, they were generally linked with reading others' posts usually preceding active engagement.

Therefore passive engagement within virtual professional communities does not necessarily mean that research participants were not accessing knowledge within their social capital, for instance, while reporting passive engagement, some of the teachers suggested the beneficial use of social media through simply reading others comments: *'I am more passive, I read everything and find answers to my questions'* (D1_village12_1T); '*I am trying to be able at least to read and filter it'* (D2_village6_1T).

On this point, recent studies suggest that these passive participants receive knowledge (Kelly & Antonio, 2016) and are able as well to "internalise existing material containing discursive identity performances of other users" (Robson, 2018, p. 446). On this point, Robson (2018) argues that although the majority of users passively participate within such spaces, this has "a constructive influence on their understandings of themselves as professionals", therefore "active engagement can be viewed in agentic, performative terms, while more passive engagement can be viewed in structured, constructive terms, linked with embedded ideals" (p.446). At the same time, Zuidema (2012) suggests that "invisible" participation could also be beneficial as it could suggest preliminary activity before participating.

Reflecting within the framework of identified concepts (Chapter 2), it could be suggested that this study has confirmed that knowledge sharing within virtual professional communities provides opportunities for informal learning on the part of both active and passive participants in virtual professional communities. Therefore, participation in virtual professional communities could be referred to as what Eraut (2000, p. 116) calls the "recognition of learning opportunities" as teachers consider this place to provide one of the opportunities to find answers to their questions or learn from other people's questions and responses, which simultaneously create conditions for informal learning of passive participants. The findings also demonstrate that opportunities for informal learning, other than that provided by formal moderators, are created by proactive teachers.

Overall, the phenomenon of passive participation is reiterated within wider research in the field of social media and most commonly is described as 'lurking', which means viewing others' postings without posting one's own (Nonnecke & Preece, 2000). In this regard, one of the reasons identified by Nonnecke and Preece (2001, p.8) from the most commonly cited reasons for lurking is time- and work-related constraints, which similarly emerged in this study with regard to lack of time. On the one hand, respondents in the present study participated in virtual professional communities because of the opportunity to save time; on the other hand, time has been highlighted as one of the forces that hinder active participation because of the lack of time during working hours and information overload.

Thus the findings of this study are in line with those of existing research on teachers' participation in social media space which suggest that lurking is associated with educators' full schedules (Dodor, Sira & Hausafus, 2010; Zuidema, 2012), and as consequence suggest that teachers' interactions mostly happens after school day (Rosenberg, Greenhalgh, Koehler, Hamilton, & Akcaoglu, 2016). However, time is not the only impediment in the process of active participation within virtual professional communities of teachers, as

> no single factor in this multicausality plays a determining role in shaping the nature of the society. Any theory of human adaptation and change in an electronic era must, therefore, consider the dynamic interplay of technological developments and a variety of psychological and structural determinants (Bandura, 2002, p.2).

To this end, in accordance with the conceptual framework of the study, which is in line with Eraut's (2004) argument that informal learning "recognizes the social significance of learning from other people, but implies greater scope for individual agency than socialization" (p.247) as well as recent results of research from outside the education (Yuan et al., 2016) which suggests that "personal factors are stronger drivers of knowledge sharing than e-service factors", this study explored the role of knowledge sharing self-efficacy.

5.4 Knowledge sharing self-efficacy in virtual professional communities

Overall, the findings of this study highlight the complexity of the factors that are associated with knowledge sharing within virtual professional communities of teachers, and, in particular, demonstrate that knowledge sharing self-efficacy is a necessary but not a sufficient prerequisite for teachers' active participation. Both qualitative and quantitative data analysis suggest that knowledge sharing self-efficacy could be one of the reasons that respondents in this study were mostly involved in receiving rather than sharing knowledge in their virtual professional communities. In this way, the findings suggest that knowledge sharing self-efficacy is partially associated with teachers' knowledge sharing and receiving in virtual professional communities, being conceptualised as a required element of the triangular relationship of informal learning within virtual professional communities (Chapter 2, section 2.4).

Overall the association of knowledge sharing self-efficacy with knowledge-sharing behaviour in virtual professional communities of teachers is consistent with the results of previous studies in the field of teachers' use of social media. Cheung et al. (2013) suggest that, in comparison with participants' satisfaction, knowledge sharing self-efficacy has a stronger association with the decision to continue knowledge sharing practice. Tseng and Kuo (2014) argue that knowledge sharing self-efficacy has a both direct and a positive relationship with knowledge sharing as well as being a predictor of altruistic intention and performance expectation, the latter two factors in their turn related to knowledge sharing.

Equally, recent exploration of teachers' perspectives on learning networks manifested in "a mixture of online and offline networks within and beyond the schools (Van den Beemt, Ketelaar, Diepstraten & de Laat, 2018) reiterates the importance of self-efficacy, as among various reasons, such as lack of support, formal time and school culture, teachers reported "lack of self-efficacy to share their knowledge and materials with others" (p. 41). Meanwhile, as well as identifying the important role of knowledge-sharing self-efficacy in teachers' virtual professional communities, this study also points out that in the process of personal appraisal some teachers could evaluate themselves as the result of comparing themselves with other teachers.

5.4.1 Professional comparison

Teachers reported comparing themselves with more experienced and more qualified teachers: *'Mostly I receive from people, because I have only three years of experience. Mostly I get information from highly qualified teachers"* (D1_village13_1T) or reported comparing themselves with more knowledgeable according to their opinions:

> *In comparison with other teachers in Kazakhstan I feel, how to say, not enough professionalism, as I need to spend a lot of time before sharing anything. In such groups where there are well-known historians in Kazakhstan, I prefer only to read or respond only when they ask for information that I know. But mostly when they start a discussion about some historical events, I try to keep silence. (D1_village10_1T)*

Therefore, an emerging theme resulting from the thematic analysis of interviews was that perceived knowledge sharing self-efficacy could be associated with teachers comparing themselves with other colleagues and, in line with social cognitive theory, could be considered a source of teachers' knowledge sharing self-efficacy in their virtual professional communities along with other potential sources, identified by Bandura (1997, p.79), such as "enactive mastery experiences", "verbal persuasion" and "physiological and affective states".

Such source of self-efficacy has been identified by Bandura (1997, p.79-86) as "vicarious experiences that alter efficacy beliefs through transmission of competences and comparison with the attainments of others", as for a lot of activities "absolute measures of adequacy" do not exist. "When adequacy must be gauged largely in relation to the performance of others, social comparison operates as a primary factor in the self-appraisal of capabilities" (Bandura, 1997, p.87).

At the same time, Bandura (1997) cautions that social comparison can manifest itself in various forms, with both positive and negative effects. To this end, Bandura (1997, p. 88) suggests that modelling is mostly significant when "perceived inefficacy reflects skill deficit rather than misappraisal of the skills already possessed": in this way, it guides and

promotes self-development. In other words, modelling can be structured in such a way that it enhances a sense of personal efficacy while avoiding the negative effect of social comparison. Within this mind-set, people regard their personal capability at a particular time as being at a temporary level in their process of development as opposed to a sign of "basic capability" (Bandura, 1997). On this point, a huge amount psychological modelling is happening in "everyday association networks", this means regularly communicated people, because of someone' choice or external requirements translate into repeatedly observed type of "competencies, attitudes, and motivational orientations" (Bandura, 1997, p.92-93).

Considered from a social cognitive perspective in the context of this research, on the one hand, it could be suggested that teachers use personally selected virtual professional communities as a place for modelling their professional development as their responses in relation to current self-appraisal could be interpreted as being transitional level: '*I don't have such confidence yet'* (D1_village10_1T). On the other hand, perceived inefficacy as a result of comparing themselves with other colleagues could reflect a misappraisal of the skills they possess, and in this way reduce teachers' knowledge sharing self-efficacy and, as the consequence, prevent them from sharing knowledge. One of the factors influencing comparative self-appraisal is 'attribute similarity', as

> people develop preconceptions of performance capabilities linked to age, sex, educational and socioeconomic level, race and ethnic designation, even though in the individuals within these groups differ widely in their capabilities. Such preconceptions usually arise from a combination of cultural stereotyping and overgeneralizations from salient experiences" (Bandura, 1997, p.98).

Therefore, it could be suggested that the research participants assessed their personal capability on the basis of preconceptions relating to teaching experience as their knowledge sharing self-efficacy beliefs were partially influenced by comparing themselves with more experienced teachers: '*Mostly I receive from people, because I have only three years of experience'* (D1_village13_1T).

To sum up, the present discussion leads to a suggestion that professional comparison could be one of the contextual sources of teachers' knowledge sharing self-efficacy, and while comparison with knowledgeable others could serve as model for self-development, preconceptions of performance capabilities relating to teaching experience could serve as a self-limiting factor when it comes to comparative self-appraisal.

5.4.2 Sense of professional connectedness

A theme emerging from the thematic analysis of interviews was that perceived knowledge sharing self-efficacy could be partially associated with teachers' sense of professional connectedness within their groups: *'How can you not share if we all know each other, in our own district we all like one family. I think we should work together'.* (D2_village2_1T); '*I think the reason is that in our group we have like-minded people, and this is interesting for us…Nobody is shy as we are like-minded people and we have a common problem [educational change]'* (D1_village9_1T).

Something that lends support to this argument could be the responses suggesting that not all virtual professional communities are described with a sense of professional connectedness: *'When something is not clear to me, I ask in my school SMU group; as for the district SMU, I prefer to ask the head of SMU directly, not in the group'* (D1_village3_1T)*; 'It turned out that among the all courses that I took, the group from this course is the most like-minded group, here we have found a real connection with each other'* (D2_village8_1T); *'In the district group I am not so active in asking questions, in general we mostly socialize in our district group and as for our regional group, we mostly receive information'* (D2_village2_1T).

It could be inferred that the present theme demonstrates that respondents in the study tended to have higher knowledge sharing self-efficacy within virtual professional communities that were set up in order to support existing relationships. In a sense, the present finding reflects the findings of Siciliano, Moolenaar, Daly and Liou (2017), who, in considering policy implementation from a cognitive perspective, researched the Common Core State Standards discussion networks. The authors suggest that formal and informal structures which exist within organizations affect the patterns of interaction as teachers tend to consult with those whom they trust in order to "to reduce the social and

psychological costs associated with seeking advice" (p. 898). Moreover, teachers also "relied on more formal roles and relations, as noted by the positive and significant effect of holding the same job title" (Siciliano et al., 2017, p. 898), which reflects this study, as interview participants reported that their virtual professional communities were formed in accordance with the taught subject or job responsibilities.

Such association between knowledge sharing self-efficacy and sense of professional connectedness could be explained by self-determination theory (SDT). In a broad sense, SDT suggests that motivation is differentiated into intrinsic and extrinsic types. Intrinsic motivation is related to inherent pleasure and satisfaction, interest and enjoyment and therefore represents self-determination. In contrast, extrinsic motivation is related to "instrumental nature" as it is about doing something not out of interest but because of some separate consequences (Deci & Ryan, 1985, Deci & Ryan, 2000).

At the same time, Deci and Ryan (1985) identified four types of extrinsic motivation, namely, external, introjected, identified and integrated forms of regulation, based on the concept of internalisation. "Internalization refers to people's 'taking in' a value or regulation, and integration refers to the further transformation of that regulation into their own so that, subsequently, it will emanate from their sense of self" (Deci & Ryan, 2000, p.71). Therefore, these four types of regulatory style along the continuum of self-determination reflect the extent to which a value for a specific behaviour has been internalised. In this regard, integrated regulation is "the most developmentally advanced form of extrinsic motivation", in which regulation is completely integrated with one's "sense of self", particularly an "individual's other values, needs, and identities" and, hence, such behaviour is "fully self-determined" (Deci et al., 1991, p.330).

Although, integrated regulation looks similar to intrinsic motivation because of its autonomous self-regulation, it is different in its character. While intrinsic motivation is related to "interest in the activity itself", integrated regulation is related to the "activity's being personally important for a valued outcome" (Deci et al., 1991, p.330). SDT suggests that internalization is promoted by social context. On the one hand, there is "relatedness, the need to feel belongingness and connectedness", on the other hand, "people are more likely to adopt activities that relevant to social groups value when they feel efficacious

with respect to those activities". Therefore, "support for relatedness and competence facilitate internalization" as well as support for autonomy that facilitates motivated actions to be self-determined rather than controlled (Deci & Ryan, 2000, p.73-74).

In this regard, considered within the framework of SDT, it could be inferred that teachers are more likely to share knowledge within virtual professional communities when they are being efficacious as they will feel a sense of professional connectedness within these groups. In this way, this discussion of the findings highlights the association between social context and self-efficacy (Deci & Ryan, 2000), and leads to a suggestion that one of the contextual factors associated with knowledge sharing self-efficacy is the sense of professional connectedness, which in its turn is not static and could be increased. In the context of social media space, this research suggests that one of the ways to promote teachers sense of professional connectedness is to increase opportunities for face-to-face meetings.

5.4.3 Face-to-face meetings and sense of professional connectedness

One of the findings from this research is that sense of professional connectedness is partly associated with the level of relationships, particularly the beneficial effect of prior face-to-face meeting with members of their virtual professional communities: *'If I need to ask, I don't hesitate as I know everyone there'* (D1_village2_1T); *'I think when you know person in real life it is easier to communicate virtually in comparison with those whom you don't know'* (D1_town_4T); *"Well, I don't know, maybe because we don't know each other and we don't have any relationship whereas in our district we meet each other at the annual August conference, in various seminars, in other words, we know each other, and it is easier for us to communicate'* (D2_village11_1T).

Considered from a network-based theory of social capital perspective, it could be suggested that teachers' knowledge sharing self-efficacy is positively associated with binding and bonding relationships. As explained by Lin (2008), binding relations, in which ties share sentiment and provide mutual support, engaging in reciprocal and intense interactions, in other words, strong ties in a dense network. Bonding relations are explained as "ties that generally share information and resources, but not all members

necessarily having direct interaction with one another or maintaining equally strong and reciprocal relations with each and everyone else" (p.59).

In line with the findings of the study, applying social capital theory, Tseng and Kuo (2014) suggest that the closer the relationships among community members the higher the level of "recognition of, and altruism towards, others" and the higher the level of teachers' knowledge sharing self-efficacy. In this regard, exploring teachers' knowledge sharing intention and behaviour within a virtual community, Chen et al. (2014) found that community trust was associated with knowledge sharing intention and consequently improved knowledge sharing behaviour. In this regard, the study that was based on 26 online communities of Dutch teachers suggests that in comparison with completely virtual communities, mixed communities, characterized by both offline and online interaction, were associated with greater sociability, due to greater level of trust and less 'free riding' (Matzat, 2010). Matzat (2010) argues that in a high-density network of mixed communities, members tend to develop "relational interest" and therefore they try to avoid "uncooperative behaviour that signals relational disinterest".

Similarly, the importance of offline relationships has been reiterated in the above-mentioned study of the largest online professional community of practice in Taiwan, in which the findings from 49 interviews revealed that active community members developed their mutual trust by meeting each other face-to-face (Tseng & Kuo, 2014). Recent research in the social media field (Goodyear et al., 2019) points out that disconnected and fragmented nature of interactions within open groups with a large number of people and suggests that smaller groups of participants is an option to overcome this issue, arguing that in "such spaces, participants can develop richer professional relations and deeper discussions about practice occur" (p. 431). Therefore, in line with existing research, this findings and discussion lead to the inference that the sense of professional connectedness in virtual professional communities of teachers is associated with the opportunities for face-to-face meetings.

To sum up, the findings and this discussion of knowledge sharing self-efficacy within virtual professional communities (section 5.4) are leading to the argument that promotion of informal learning in virtual professional communities requires consideration of the

ways in which teachers' knowledge sharing self-efficacy may be increased. Therefore, the findings are in line with Eraut's (2004) argument that informal learning "recognizes the social significance of learning from other people but implies greater scope for individual agency than socialization" (Eraut, 2004, p.247). Although the role of knowledge sharing self-efficacy has been studied extensively in previous research in other cultures (Cheung et al., 2013; Tseng & Kuo, 2014; Van Den Beemt et al. 2018), the contexts of research is in Kazakhstan. My study shows that knowledge sharing self-efficacy is also associated with knowledge sharing in the context of virtual professional communities of Kazakhstani teachers.

The thematic analysis of the interview transcripts in this study provided illustration of *professional comparison to be a* source of knowledge sharing self-efficacy in virtual professional communities. Although further research is required to confirm these findings within the research context, it appears that, in line with Bandura's (1997) theoretical propositions, on the one hand, perceived knowledge sharing inefficacy in comparison with others could promote self-development but, on the other hand, perceived knowledge sharing inefficacy resulting from comparing oneself with other colleagues could result in misappraisal of the possessed skills, based on self-limiting preconceptions of performance capabilities relating to teaching experience.

Equally the source of knowledge sharing self-efficacy in virtual professional communities was partially associated with a *sense of professional connectedness*. The findings from this research highlighted the association between social context and self-efficacy (Deci & Ryan, 2000), as it is suggested that knowledge sharing self-efficacy associated with a sense of professional connectedness. It appears that in line with existing research (Matzat, 2010; Tseng & Kuo, 2014), the sense of professional connectedness in virtual professional communities of teachers in the context of this research was associated with the *opportunities for face-to face meetings*.

5.5 Moderators in virtual professional communities

The discussion of the findings so far has demonstrated that membership within virtual professional communities is a widespread phenomenon among the respondents of the study (section 5.1.1) including membership in the groups organized by school administrators, local executive authorities and in-service teacher training organisations (section 5.1.2). In this regard, one of the recommendations of this study could be related to raising the importance of moderators in such virtual professional communities of teachers in Kazakhstan, organized by different stakeholders of the education system. With the aim to explain the proposed recommendation, in this final part of the discussion chapter I will reflect on the role of moderators in such communities in response to identified findings.

The research literature related to the need for moderators discusses various reasons for why and how they could promote knowledge exchange. Cross-case research findings (Booth, 2012, p. 1) demonstrate that active coordination of "an experienced and credible moderator" helps to cultivate and sustain knowledge sharing and trust. To this end, Holmes (2013) adds that moderation is especially crucial at the beginning when there is a need to encourage engagement. Facilitating the discussions through additional comments and questions, moderators can increase participants' engagement (Riding, 2001). Bishop (2007) consider that the best way to change the beliefs of 'lurkers' is to nurture novices in the community. He believes that 'lurkers' may be those who have tried to post but were ignored, and therefore, if they can see that those who are new to a community are treated well and are always provided with constructive feedback, they can change their beliefs. Correlating the success of online communities with moderation, Gray (2004) considers the role of the online moderator to be crucial for its sustainability over a long period as well as deepening the learning experience of community members by promoting critical reflection on their practice and group identity. Providing example of teachers' informal learning within #Edchat group, Britt and Paulus (2016) point to the role of moderators in selection of the topics and initiation of conversation relevant to the communities. Finally, recent study of Elementary schoolteachers' use of Twitter found moderated chats to be a source of learning (Nochumson, 2020). The reflection on the role of moderators within this study is related to the process of dialogic learning as dialogic

nature of knowledge sharing in virtual professional communities has been identified as the most common practice of teachers' engagement in such space (section 5.3.2).

The role of moderators in dialogic learning

In line with Wegerif's (2007) argument in regard with perspective to "expand the spaces for learning" with digital technologies, based on Vygotsky and Bakhtin's theory of dialogic learning, Yang (2014) argue that owing to 'convenient discursive space' and 'heightened interactivity' social media may facilitate dialogic learning. In this line, reviewing the principles of connectivism in the digital age from a dialogue perspective, Ravenscroft (2011, p.155) poses the need for "pedagogical shaping of the learning process within networked learning spaces through adopting contemporary approaches to learning design". To this end, with an understanding that Internet facilitate an updated version of educational dialogue promoting per-to-peer learning, Wegerif (2020, p. 15) suggests that "Internet returns us to some of the dialogic affordances of oral societies but with difference that the dialogue now no longer limited to face-to-face groups".

Reflecting on the role of digital technology in supporting productive classroom dialogue as the result of thematic synthesis of systematic scoping review Major and Warwick (2020, p.397) suggest "three inter-related and inter-dependent high-level themes relating to how use of digital technology is reported to enhance productive classroom dialogue: (i) 'dialogue activity', (ii) 'learning environment', (iii) 'technology affordances'." Where "*dialogue activity'* identified within four sub-themes: alternative perspective, knowledge co-construction, meta-cognitive learning, scaffolding of understanding. The theme of *'learning environment'* incorporated five themes, namely: "learner autonomy; learner inclusion and participation; classroom atmosphere; interpersonal relationships; motivation and engagement" (ibid., p.397). While "*dialogue activity'* and *'Learning environment'* were summarised as what technology enables, a third theme – *'technological affordances'* was presented as a means of explaining the virtue of technology for dialogic learning. In particular, it was identified within nine sub-themes, such as: "creation of shared dialogic space; mediating interaction, externalisation of ideas; informing teaching; multimodality; pace; provisionality; representation of content; temporal factors' (ibid., p.397).

Although the above mentioned relationships of digital technology and dialogic education were discussed in relation to students' dialogic learning, it could also be applied in teachers' learning, in particular, within informal learning in virtual professional communities. To this end, reiterating general acceptance of professional talk to play essential role in teacher learning on the job, as the result of systematic review of sixty four articles Lefstein, Louie, Segal and Becher (2020) report "an emerging consensus in the literature regarding a number of practices, norms, and structures that are likely to be generative of teacher learning". In particular, discourse practices, such as: revealing and probing problems of practice; providing evidence or reasoning; making connections to general principles; building on others' ideas; offering different perspectives. In the same review, Lefstein, Louie, Segal and Becher suggest that skilled facilitation is a repeatedly appeared to be a tool for supporting teacher discourse and expect distance learning platforms and social media to be progressively pertinent to teachers' learning and work lives. To this end, reviewing seventeen studies that highlighted the role of skilled facilitation, Lefstein, Louie, Segal and Becher (2020, p.10) point that, facilitators are those who establish "productive norms for discourse and in engaging teachers in the discourse practices", as well as those who "bring new knowledge and perspectives", in particular when additional expertise is required. The following sections will be devoted to reflections within these two broad roles.

Establishing productive norms for discourse

Facilitation of productive norm for professional dialogue in virtual professional communities requires moderators to jointly establish and model grounded rules for talk. In this line for decades the research literature (Dawes, 2011; Edwards & Mercer, 1987; Mercer & Littleton, 2007; Mercer, Wegerif & Dawes, 1999) has been advocating for the need for such rules in order to facilitate classroom dialogue and collaboration. Considering teachers' collaborative dialogue in the contexts of lesson study, Dudley and Vrikki (2020, p. 222) suggest that the rules should involve the need to respect contributions of all colleagues and the need to move away from hierarchies and to "come together in a 'safe space', equal as learners and with a shared endeavour of pooling knowledge, experience and expertise to improve pupils' learning".

Simultaneously, considering the importance of the ground rules for dialogic learning, Rasmussen, Amundrud and Ludvigsen (2020) raise the importance of the rules related to the ways of productive engagement with new technology in the classroom context. They argue that digital technology can change the way of communication and collaboration. In this way aiming to examine how the ground rules for classroom interaction are transformed with integration of digital technologies, Rasmussen, Amundrud and Ludvigsen (2020) reason that students are required to learn productive ways of engaging in a dialogue within a social media space. Similar to student's vulnerability in a public co-construction process in a social media space, the context of virtual professional communities of teachers requires grounded rules for teachers' professional dialogue. Moreover, the grounded rules for a dialogue in virtual professional communities should also provide a shared understanding of the ways how to communicate in order to overcome ethical challenges of teaching profession associated with social media space, in particular, discussed in section 5.1.2.4, such as dilemmas associated with personal and professional identities and issues of peer pressure, privacy and confidentiality.

Although, research literature (Lantz-Andersson at al., 2018; Lefstein, Louie, Segal & Becher, 2020) reiterate the importance of skilled facilitation in the process of supporting professional talk of teachers, including within a social media space, the same authors caution that the notion of facilitator may itself be controversial suggesting an uneven distribution of power and amplification of hierarchies, while the essence of dialogue suggests two or more perspectives. Recently, Wegerif underlines that:

> Every dialogue has the structure of several different perspectives held together around a gap of difference. This gap of difference is essential to how dialogues work to generate new meaning. New meaning emerges as a co-creation or co-authoring out of the creative tension that is the gap of difference within dialogues. The dialogic gap operates like a hinge around which we can switch perspectives to see as if from another point of view, not only that of specific other but also that of Generalised Other and the 'witness' voice or perspective of the 'Infinite Other' (2020, p.19-20).

Underlining complex practise of facilitating knowledge construction among virtual networked learning community members, recent empirical research provides an argument for the vital need of ensuring teachers "to recognise the importance of co-owning and co-leading the knowledge construction in online collaborative environments" (Lee et al., 2020). In this line, discussing dialogic pedagogy for progressive dialogue in computer supported collaborative knowledge building, Chan, Tong and van Aalst (2020) review set of principles for teachers to adhere in such work with students. Most of these principles could be suggested to moderators of virtual professional communities. The first set is related to the need to promote collective agency, in particular, constantly demonstrate engagement in 'exploratory talk' acting as a co-investigator and a knowledge-building community member. The second, is related to the need to promote explicit awareness of idea improvement, in particular pointing to the ideas that requires attention for further consideration, which is easily done in computer mediated dialogue space. The third principle is related to the promotion of 'rise-above and meta-dialogue' in order to "deepen and to synthesize for emergent and sustained dialogue" (Chan, Tong & van Aalst, 2020, p.480), in particular, promote discussions on what has already been accomplished in solving certain issue and identifying new questions and goals.

At the same time, considering active engagement of teachers in discussed dialogic space, along with factors such as "culture of sharing, a conducive environment, shared ownership and organisational support" collaborative knowledge construction also depends on the "design and affordances of the online collaboration space" (Lee et al. ,2020, p.12). Equally, identifying the key role of moderators in the process of facilitating the discussions, Goodyear, Parker and Casey (2019, p.129) point out their role in encouraging teachers to "question their own or each other's beliefs and/or practices". Such multifaced and interdependent range of factors is a growing area of research which increases our understanding of how to promote teachers' participation in virtual professional communities. To this end, understanding that no single factor is playing determining role in shaping teachers' engagement in virtual professional communities, this study, being my initial step towards trying to understand this phenomenon in the context of Kazakhstan, suggests that knowledge sharing self-efficacy is one of the factors associated with active engagement of teachers in such communities. Therefore, another

area for moderators' consideration could be related to the teachers' knowledge sharing self-efficacy.

While promoting knowledge sharing in virtual professional communities, moderators should appreciate teachers' participation and encourage further engagement, as past experiences is a source of members' self-efficacy perceptions (Bandura, 1997). At the same time, in line with existing research, the findings of the present study reiterate importance of face-to-face meetings to increase the sense of professional connectedness between members of virtual professional communities of teachers (section 5.4.3) associated with knowledge sharing self-efficacy (section 5.4.2). Therefore, one of the roles of moderators could be creating opportunities for face-to-face meetings and collaborations. So that along with opportunity to increase a sense of professional connectedness, teachers could have opportunities for establishing "recognition of, and altruism towards, others" (Tseng & Kuo, 2014) as well as trust (Chen et. al., 2014, Matzat, 2010; Tseng & Kuo, 2014).

Finally, one of the potential contextual factors associated with professional dialogue practice in virtual professional communities could also be related to the 'fear of mistakes'. On the one hand, the fear of mistake in the professional practice could be one of the drivers for asking questions in virtual professional communities, on the other hand, low self-confidence to share knowledge could also be related to a social fantasy in relation to the fear of mistakes (Kjellstrand & Vince (2017). Exploring organizational learning in Kazakhstan and suggesting that social and structural sides of organizations are still shaped by the Soviet past. Kjellstrand & Vince (2017, p.1) argue that 'no room for mistakes' "is sustained through blaming and punishing the people who make mistakes, and through feelings of internalised embarrassment and guilt that are enacted through interpersonal relations of shaming and being ashamed." To this end, one of the productive norms for professional dialogue in virtual professional communities within the research context could be the culture that allows room for mistakes.

Bringing new knowledge and perspectives

Although the study has its limitations it could be considered as an attempt to move the conversation forward in relation to the conditions for teachers' informal learning within

a social media space, in particular in the context of Kazakhstan. To this end, the use of a social media platforms within professional networks of teachers has been reinforced not only by the rise of such platforms but also by the response to the resent pandemic, which appeared after the completion of this study. Suggesting the ways to overcome the problem of school closure, "online collaborative platforms that allow them [teachers] to share their resources and give and receive peer feedback" has been identified as one of the education responses to covid-19 (OECD, 2020a, p.2).

Reflecting now on the identified findings from the perspective of the recent call for distance learning in the context of school closure problem, it could be suggested that the need for professional connectedness in such circumstances is even higher than it was presented in the findings. On the one hand, the need is driven by the challenges of self-isolation. On the other hand, the need for professional connectedness is increasing in response to the educational changes. Apart from the changes identified within this study in relation to the update of the content of the secondary education in Kazakhstan (section 5.2.2), teachers are now facing new professional learning needs in relation to the new roles and responsibilities in the context of distance learning. One of the demands for teaching profession in the context of distance learning is related to the need for updating the knowledge on instruction, assessment, learning and leadership for change (OECD, 2020b).

Therefore, considering the role of moderators to bring new knowledge and perspectives to the professional dialogue within virtual professional communities as well as contextual needs, the content of exchanged professional knowledge would benefit from the resources and expertise in the areas related to the current educational change movement in the country, distance learning as well as identified needs as a result of 'rise-above and meta-dialogue' (Chan, Tong & van Aalst) within particular virtual professional communities. Therefore, the role of moderators is to ensure knowledge flow between teachers and external experts (researchers, teacher educators and other professionals) as well as teachers with a particular expertise. To this end, timely to state that such role requires moderators to approach this process more thoroughly, as "dialogue is essential to our response to the current cultural crisis, but only if it attends rigorously to those of its

ingredients that are under most sustained attack: voice, argument, truth and language itself" (Alexander, 2020, p.682).

As a result of the present reflection it could be argued that moderators within the process of dialogic learning play an essential role, hence, how to create conditions for productive work of moderators in virtual professional communities could be considered as one of the promising areas of research and practice. Understanding the need for a credible moderator and considering the main objectives of the moderators Gairín-Sallán, Rodríguez-Gómez and Armengol-Asparó (2010) argue that this position requires the need for certain knowledge and skills and consequently requires "training as moderators of online groups" in order to facilitate the process of "knowledge creation and management" (p. 311). At the same time, they argue that "choosing moderators is as important as training them", suggesting that the moderator should for example have "certain attitudes and qualities that actually foster their activity and results" (Gairín-Sallán at al., 2010, p.311). Therefore, it could be summarised that to have a 'good' moderator is a challenge in itself. Moreover, even within the formal context of virtual professional communities when there are appointed and trained moderators, along with the above mentioned challenge of moderators' capacity, there is also a challenge related to the calculation of time required to moderate a community of teachers (Andrew, Ferguson, Wilkie, Corcoran, & Simpson, 2009).

CHAPTER 6. CONCLUSION

Chapter will present:

6.1 Final summary of the study

6.2 Recommendations and areas for future research

6.1 Final summary of the study

Reinforced internationally in the context of educational improvement, teachers' professional networks, as a source of social capital, have been conceptualized as an integral part of teacher professionalism (Hargreaves & Fullan, 2012; Shirley, 2017; TALIS, 2016, 2018), as well as an essential element of successful educational change (Daly, 2010; Brown, & Poortman, 2018; Fullan, 2016; Quintero, 2017). Within the context of what Van Dijck et al. (2018) calls "the platform society", the use of social media platforms within professional networks of teachers has become an agenda for both research and practice. In line with increased attention to and promotion of professional networks of teachers for learning in Kazakhstan, including by means of digital technologies and conceptualizing teachers' engagement within professional networks of teachers in social media spaces as part of an informal learning, this study set out to explore the use of social media in professional networks of teachers. In this way, the study aimed to understand how to support informal learning in virtual professional communities as part of building and leveraging the social capital of educators. In particular, this study explored the nature of virtual professional communities and teachers' participation within them.

Overall, this study provides empirical evidences that social media is gradually becoming an integral part of the process of building the social capital of educators, as deliberating with the help of Lin's (2001) definition of social capital, it could be stated that accessed by teachers, knowledge (news/information, opinions, experience, resources) in virtual professional communities could be considered as one of the resources embedded in virtual professional networks of teachers. Therefore, it could be argued that informal learning in virtual professional communities becomes part of the professional duties of a practising teacher, which could be part of what Hargreaves and O'Connor (2018) call "collaborative professionalism".

The findings (Chapter 4) lead to the argument regarding the main theoretical contribution of this study, as it has confirmed the triadic relationship between the need for professional connectedness, knowledge sharing self-efficacy and knowledge sharing and receiving (figure 2.3) that have been conceptualized as part of the necessary conditions for informal

learning in virtual professional communities (Chapter 2). At the same time, the originally conceptualized model (figure 4.14) involved only direct relationships of knowledge sharing self-efficacy with knowledge sharing and receiving, as well as the need for professional connectedness with knowledge receiving. As a result of several diagnostic measures and Bandura's (1997) theoretical propositions (Chapter 4, section 4.3.1), this study suggests that knowledge sharing self-efficacy could also be indirectly associated with knowledge sharing and receiving in virtual professional communities through the need for professional connectedness (figure 4.17).

Although it is difficult to identify all factors that could explain this complex social phenomenon, this study provides a conceptual framework to enable partial understanding of teachers' engagement in virtual professional communities in the context of informal professional learning. In particular, this study argues that informal learning in virtual professional communities requires the need for professional connectedness as part of professional identity and commitment for learning as well as the need for teachers' knowledge sharing self-efficacy as a manifestation of proactiveness in making use of available learning opportunities, which in turn generates knowledge sharing and receiving in virtual professional communities and, consequently, benefits both active and passive participants.

As well as identifying contextual types of virtual professional communities, the study identifies some of the contextual factors associated with the need for professional connectedness in the research context, such as professional isolation of teachers in rural schools, the need for mentoring support, and the context of educational change, and contextual sources of knowledge sharing self-efficacy, such as professional comparison and a sense of professional connectedness. Finally, in contribution to the growing body of research, the present study also argues for the importance of face-to-face collaboration within and beyond the schools in order to promote professional knowledge exchange within virtual professional communities.

Even though this study could be considered as being limited by its cross-sectional nature and generalized variables in the quantitative data analysis, it contributes research and practice in the fields of teacher professional learning and educational improvement

elsewhere, and particularly in Kazakhstan, by identifying the above-mentioned findings, as well suggesting contextual recommendations and areas for future research, which will be summarized in the following section.

6.2 Recommendations and areas for future research

This section of the final chapter presents recommendations and avenues for further research within the framework of identified concepts. Therefore, the section is divided into three parts, namely, the need for professional connectedness, knowledge sharing self-efficacy knowledge, and sharing and receiving in virtual professional communities.

The need for professional connectedness

This study suggests that part of the contextual drivers associated with the need for professional connectedness could be related to the need for mentoring support, educational change and working conditions in rural schools. Therefore, although teachers could be active agents of knowledge exchange within such communities, one of the first recommendations of this study is that virtual professional communities could be promoted as a useful instrument for providing opportunities for informal learning of teachers by pre-service and in-service teacher training educators as well as Education departments of LEAs in the context of identified contextual needs.

Promotion of informal learning in virtual professional communities requires the building and sustaining of a strong commitment for learning as part of a professional identity. Variations in the use of social media for professional communities in accordance with teachers' age, as well as the need for mentoring support in virtual professional communities, emphasize the importance of the conditions, provided within and beyond the school that are required to maintain teachers' commitment in later phases of their professional life.

Knowledge sharing self-efficacy

An increased need for professional connectedness, identified role of knowledge sharing self-efficacy and knowledge sharing pattern in virtual professional communities brings into the focus the role of moderators in virtual professional communities (section 5.5).

Hence, one of the proposed recommendations is to raise the importance of moderators in virtual professional communities, particularly in formally organised by the LEA, in-service and pre-service teacher training organizations as well other professional bodies.

Overall, this study emphasizes the importance of knowledge sharing self-efficacy within informal learning in virtual professional communities, and a follow-up study could be conducted in order to explore knowledge sharing self-efficacy in different types of virtual professional communities. Equally, further avenues for research in relation to knowledge sharing self-efficacy within virtual professional communities could consider other, apart from the need for professional connectedness, anticipatory cognitive motivators shaped by teachers' working conditions.

Knowledge sharing and receiving in virtual professional communities

One of the implications of this study is that common course (different districts and/or regions) or common place of work (school, district, region, country) could be considered as drivers of professional relationships within social media space. Although the present study provides part of the conceptual and contextualized understanding of knowledge sharing and receiving in these communities, a further line of inquiry in relation to these phenomena could be related to the contextual factors preventing knowledge sharing in virtual professional communities in the context of professional dialogue between all stakeholders, particularly in the context of educational change.

One of the recommendations of this study is that teaching subject could be considered as one of the most common factors associated with virtual professional relationships. In this regard, the SMU at school and district levels, as well as recent subject-specific courses that addresses updating of the content of the secondary education system, could be recommended as a subject-related infrastructure for building social capital of teachers in virtual professional communities. At the same time, this study asserts the importance of subject-specific professional bodies, including their presence in social media space with the understanding that it will help to increase the opportunities for building the social capital of educators, including the provision of access to external social capital (Lin, 2008) and in this way a source of new subject-specific knowledge within the process of sustainable instructional improvement. Finally, this exploration of knowledge sharing and

receiving in virtual professional communities paves the way, particularly for me as a practitioner, for exploration of ethical challenges within virtual professional communities of teachers in the research context.

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APPENDIX 1

QUESTIONNAIRE ITEMS INCLUDED IN THE PRESENT STUDY

BACKGROUND INFORMATION

1. Please indicate (✓) your gender

1. Female □ 2. Male □

2. How old are you (✓)?

1) Under 25 □ 2) 25-29 □ 3) 30–34 □ 4) 35-39 □ 5) 40-44□
6) 45-49 □ 7)50-54 □ 8) 55-59 □ 9) 60+ □

3. How many years of professional experience do you have (✓)?

1) 1-2□ 2) 3-5 □ 3) 6-10□ 4)11-15 □ 5) 16-20 □ 6) 20 - 25□ 7) 25 - 30□ 8) 30+□

4. What is your teaching subject?

1 □ **Primary school** (Language and Literature, Math, Science, World Understanding, Art, PE)
2 □ **Language and Literature** (Kazakh, Russian, Uigyr, Uzbek, Tadzhik, etc.)
3 □ **Foreign Language** (English, German, French, etc.)
4 □ **Math and Computer science** (Math, Algebra, Geometry, Algebra and Math Analysis, Computer science)
5 □ **Science** (World cognition, Geography, Chemistry, Biology, Physics)
6 □ **Human and Society** (Kazakhstan History, World History, Human. Society. Right, Self-cognition)
7 □ **Art** (Music, Painting)
8 □ **Technology** (Technology, Technical drawing)
9 □ **Physical Education** (Physical Education, Initial Military training)

5. Where do you work? (✓)

1 □ Village
2 □ District centre
3 □ Regional centre
4 □ Astana or Almaty

VIRTUAL PROFESSIONAL NETWORKs

Virtual professional network *– virtually interconnected a network of educators, interacting on professional issues.*

6. Have you ever been registered with any virtual professional network (✓)?

1 □ Yes
2 □ No

7	**What is the main thing that unites members within your groups of virtual professional network?** *(if you are member of different networks or one group has several of listed things then you can answer "yes" more than once)*	***Yes***	***No***
1	The same subject		
2	The same project		
3	The same difficulties, related to changes in educational system		
4	Common place of work (school, district, region)		
5	Common teacher training course		
6	Common teacher training seminar		
7	Others: (please specify)		

8	How would you rate the level of your confidence in the following activities within virtual professional network?	Low level of confidence … 1	2	3	4	High level of confidence 5
1	Sharing teaching resources					
2	Sharing an opinion					
3	Sharing an opinion even if it is different from others					
4	Sharing my teaching experience					
5	Sharing my ideas for teaching					
6	Sharing my positive emotions					
7	Sharing my negative emotions					
8	Sharing my success					
9	Sharing my failures					
10	Initiating discussions in relation to certain, interesting for you topic					
11	Sharing news and links to other websites					

9	To what extend do you agree with the following statements?	strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
1	Creating a virtual professional group with my colleagues makes me feel a member of a special club					
2	Being a member of a virtual professional group makes me feel myself special to be able to connect with teachers from all over the country					
3	Being a member of a virtual professional group, gives me a feeling that I am not on my own					
4	Being a member of virtual professional networks, I feel myself less isolated from other professionals in my country					

10	During the past six months, I have …	Never	Seldom	Often
1	read other members' posts, that included ideas, opinion, experience			
2	read other members' posts, that included news			
3	read other members' posts that included links to other websites			
4	downloaded teaching resources from the group discussions			
5	asked for other members' ideas, opinion, experience			
6	asked for news on educational policy			
7	asked for links of websites necessary for teaching			
8	asked for group members' resources			

11	During the past six months, I have …	Never	Seldom	Often
1	uploaded my teaching resources in my groups			
2	initiated discussions in relation to interesting for me topics			
3	shared news on educational policy			
4	shared links of websites that may be interesting for teachers			
5	shared my emotions			
6	shared my successful teaching practice			
7	shared my failures and problems			
8	shared ideas for teaching practice			
9	shared my opinion on educational policy			
10	responded to the topics discussed			
11	expressed my concern and encouragement to other members			

APPENDIX 2

SEMI-STRUCTURED INTERVIEW SCHEDULE

1. What is your teaching subject?
2. How long have you been working as a teacher?

3. How long have you been registered within your virtual professional network?
4. Why did you decide to join?
5. What platform(s) do you use for your virtual professional networks?

6. Who are the members of your virtual professional network?
7. Are you satisfied with your experience of participating in virtual professional groups?

8. What do members in your virtual group(s) usually share or ask for?
9. How active members of your groups?
10. Do you personally share anything in your virtual professional group?
11. If yes, what do you usually share? Could you, please, remember what have you recently shared with your colleagues?

APPENDIX 3

INFORMATION SHEET FOR PARTICIPANTS

Project title: Knowledge sharing in virtual professional communities of Kazakhstani teachers.

Researcher: Assel Sharimova, PhD student, Faculty of Education, The University of Cambridge
Supervisor: Elaine Wilson, Senior Lecture, Faculty of Education, The University of Cambridge

Aim of the Research Project: The study aims to explore teachers' attitude towards knowledge sharing in virtual professional communities.

Ethical details

- Feel free to withdraw at any time during the survey, however we would appreciate as full a set of responses as you feel comfortable to complete.
- Overall results at the group level gained during the study may be published, but you will not be identified, and your personal results will remain confidential.
- The data will be stored with the researcher in password protected files in as anonymous means as possible.
- Please contact myself or my supervisor if you have any questions or require further information.

PARTICIPANT CONSENT FORM

- I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me. I understand and agree to take part.
- I understand that I may withdraw from the research project at any stage.
- I understand that while information gained during the study may be published, I will not be identified, and my personal results will remain confidential.
- I understand that data will be stored with the researcher and will only be used for the purposes of the research project. Only the researcher, supervisors and examiners will have access to any of the data collected.
- I understand that I may contact the researcher or supervisor if I require further information about the research.

Signed …… (Research participant)
Date ……

Contact details:
Researcher **Assel Sharimova**:
Supervisor: **Elaine Wilson:**

APPENDIX 4

TRANSLATION OF THE LETTERS TO THE REGIONAL/DISTRICT EXECUTIVE AUTHORITIES

Dear …,

My name is Assel Sharimova, being a holder of "Bolashak" international scholarship I am pursuing my doctoral study at the University of Cambridge (PhD in Education). The object of my research during the study is the exchange of knowledge in virtual professional networks of teachers, particularly the research aim is to understand teachers' perception towards virtual professional communities and their participation.

I am writing to seek your permission to conduct paper-based questionnaire and interviews with teachers, working in schools under the auspices of … regional (district) educational authority. The recruitment of participants will be organised on a voluntary basis. Overall results at the group level gained during the study may be published, but research participants and schools will not be identified, and personal results will remain confidential.

If you grant your permission for participation, I will schedule administration of the survey and interviews and make all necessary arrangement with as little inconvenience as possible. The proposed time frame for data collection: November 2017- March 2018.

Your support within the present study will be highly appreciated.

Attachments: Information and consent form for the teachers

Your sincerely

Assel Sharimova

Contact details